WIRE & WIRE PRODUCTS

In This Issue:

Rod Cleaning and Coating

By L. D. Granger

New Studies of Wire for Steel Ropes

Why Price Salesmen Cannot Sell Cyclone Fence

By John W. Meaker

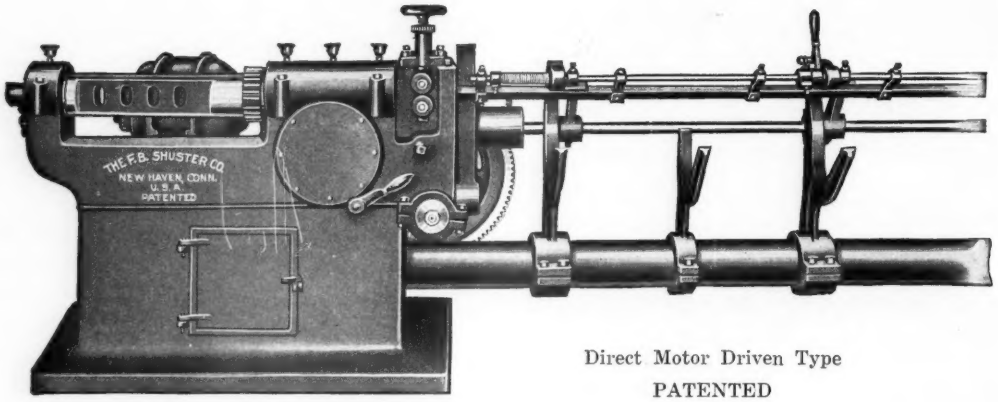
Accident Prevention in Wire Mills

By M. A. Hall

Abstracts of Current Literature on Wire

February 1927

The SHUSTER way is the profitable way to straighten and cut wire



Direct Motor Driven Type
PATENTED

Entirely automatic—requires only to be kept supplied with coils of wire and turns out a tremendous quantity of perfectly straight wire, cut to accurate lengths.

Stands up to its work day after day for years.

Continuous Operations—Feeds Through Coil After Coil Without Stopping the Machine

Adjustments so simple unskilled labor can take care of them, so cost of operation is very small.

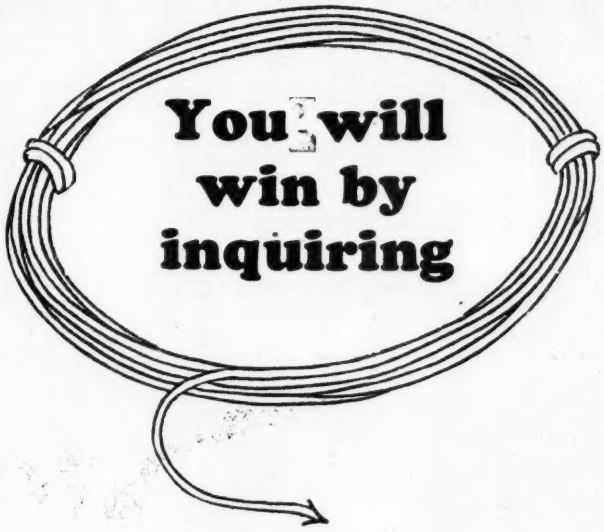
May we send you Catalogue W ?

The F. B. Shuster Co. 1400 State St. New Haven, Conn.

Formerly John Adt & Son **Established 1866**

STRAIGHTENER SPECIALISTS

WIRE & WIRE PRODUCTS. Vol. 2, No. 2, February, 1927. Publication office, 49 East Washington Avenue, Washington, N. J. Executive office, 471 Fourth Avenue, New York, N. Y., by the Hoffman Publications, Inc., Sylvan Hoffman, President. Subscription price, Domestic, $5.00 per year, 50 cents per copy; Foreign and Canada, $7.50 per year. Entered as second class mail at the Post Office at Washington, N. J., under the Acts of March, 1879, and copyright, 1926, by The Hoffman Publications, Inc.



The most productive and carefully selected machines for the Wire Industry, from the European market, are our line. This is the field in which we shift in your manufacturing problems.

Chain Forming Machines for electric welding and other purposes.

Cold Working Rivet Presses and Combined Cold Working Rivet and Bolt Presses.

Electric Chain Welding Machines.

Gem Clip Machines.

Pin and Needle Machines.

Point Grinding Machines.

Wire Drawing Machines

Wire Nail Machines.

Wire Spooling Machines.

Wire Staple Machines.

Wire Weaving Looms.

Pamphlets, Estimates f. o. b. your plant, Expert Engineering advice and service are cheerfully rendered.

M. A. IRMISCHER

48 EAST 41st STREET, NEW YORK CITY

SOLE AGENT IN THE U. S. A. AND CANADA FOR

Malmedie & Co., A. G. Dusseldorf
F. W. Buendgens, Aachen

Franz Irmischer, Saalfeld
Lorbeer & Schwenk, Saalfeld

A SCOTT TESTER

For Wire, Sheet Metals and Other Materials

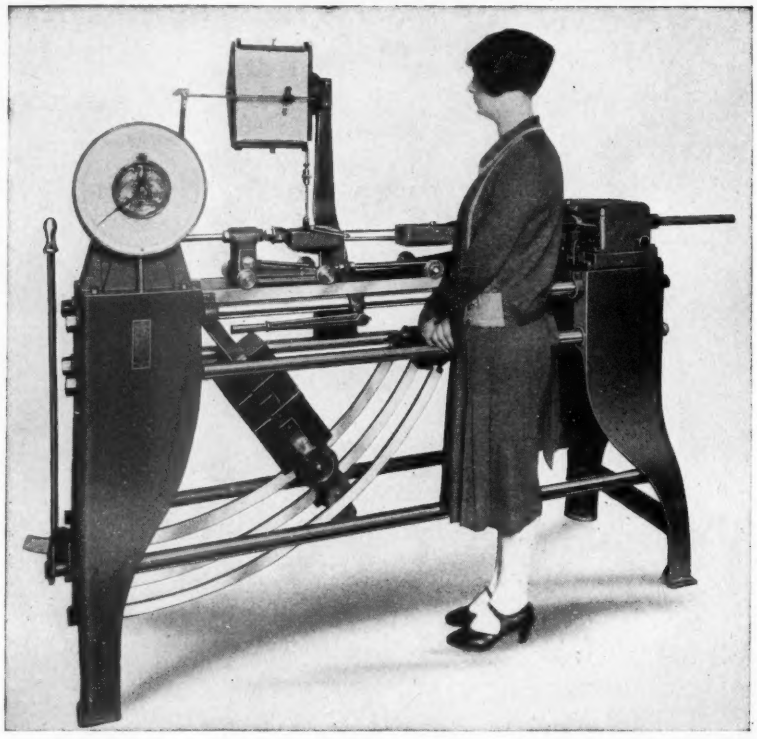
A Simple,

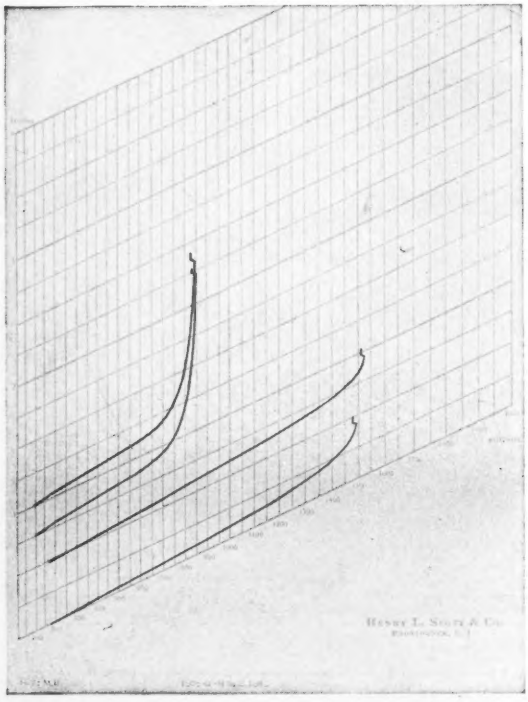
Practical

Recording Tensile

Testing Machine

Maximum Capacity
2,000 Lbs.





Can Be Operated By Anyone

Test Results, Automatically Recorded on Forms Standard Letter Size (8½x11 inches).

Easily Handled, Safe, Strong. Free From Delicate Parts. Practically "Fool Proof".

Manufactured By

Henry L. Scott Co.

101 Blackstone St., Providence, R. I.

THE various announcements that have been made in this column concerning our plans to introduce divers additions to the subject matter of WIRE AND WIRE PRODUCTS have in the past been followed by successful executions. We hope that our intentions to cover the field of copper wire will mature as readily.

* * *

The rapidly increasing consumption of copper wire in its many forms deserves more attention than we have given it in the past, and although we have published occasional articles on the subject in previous issues, more thorough discussions will be published of the problems of copper wire drawing, insulation, merchandising and also the metallurgy of copper insofar as it bears on the drawing.

* * *

We are pleased to be able to call the attention of our readers to the first installment of a a series of articles on Rod Cleaning and Coating by Mr. L. D. Granger, whose previous concontributions to WIRE AND WIRE PRODUCTS have met with great interest.

* * *

This is a very important instance of such discussion by an engineer in the wire industry being published and we hope it will set a precedent for other open discussions of the technology of wire drawing. Heretofore the general policy has been to keep all information within the walls of the mill, a practice which has — more than any other fact—been responsible for the slow development of the industry.

* * *

Research workers of large wire and wire rope manufacturers in England have made a notable step in this direction and a number of important communications have been made on recent development, which, by the way, were undertaken in the laboratories of individual firms. We publish in this issue a review of some of these developments.

The Publishers.

WIRE & WIRE PRODUCTS

A monthly publication devoted to wire drawing and wire forming

Vol. 2 February, 1927 No. 2

Contents

Rod Cleaning and Coating By L. D. Granger - - - 43
Important information on acids and vats in the treatment of high and low carbon steels.

Wire for Steel Ropes - - - - - - - - - 46
A Review of British investigations on the characteristics of rope-wire.

Wire Market in Baltimore - - - - - - - - 47

Why a Price Salesman Cannot Sell Cyclone Fence By John W. Meaker - - - 48

Accident Prevention in Wire Mills By M. A. Hall - - 51

Manufacture of Carbon Drill Rods By Edward Baker - 53

The Making of Diamond Dies, Part I, By F. Krause - 53

Editorials - - - - - - - - - - - 56

Views of the Wire World - - - - - - - - 57

Books - - - - - - - - - - - 58

Review of Recent Patents By Eugene Grunstein - - 61

Digest of Current Literature on Wire - - - - - 62

Japanese Wire Industry - - - - - - - - 63

At the Institute of Metals - - - - - - - - 63

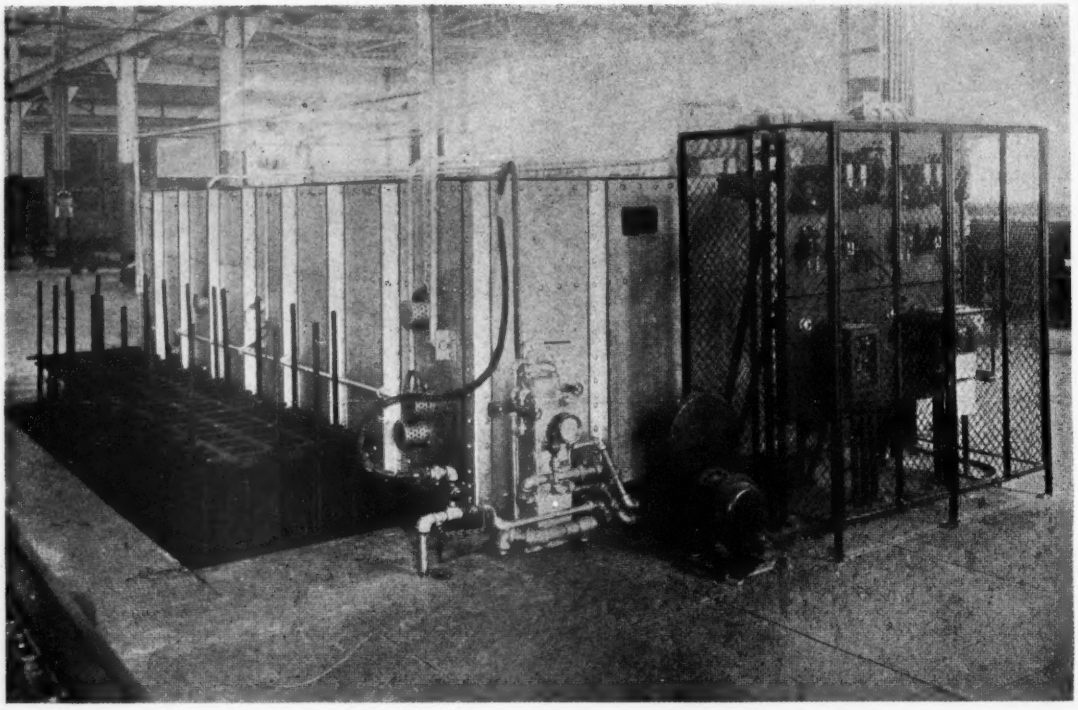
Buyers' Guide - - - - - - - - - - 70

Editor-in-Chief
WILLIAM GRUNSTEIN, E. E.
Associate Editors
L. D. GRANGER, A. M.
CARL MARX, B. Ch. GEORGE A. PAFF
EDWARD BAKER, B. S. WILLIAM C. SEGAL, B. S.
SYLVAN HOFFMAN, Publisher
ALAN COHEN, Adv. Dir.

Editorial Offices:
471 Fourth Ave., New York City, Tel., Ashland 0568
Publication Office, Washington, N. J.
Issued Monthly Subscription Price U. S. $5.00
50c a Copy Foreign $7.50 per year

Copyright 1926

KENWORTHY
NONOXIDIZING
ANNEALING FURNACES



36"x15'-0" WIRE ANNEALING FURNACE, 390 KW. CONNECTED LOAD
A. H. WELLS & CO., Waterbury, Conn.

Eliminate Unnecessary Operations in Heat Treating

No pickling or cleaning of wire annealed in this electric NON-OXIDIZING furnace!

And it assures that essential factor in annealing wire: UNI-FORMITY.

Its operation is clean, economical and efficient and—

It may be used as well for the annealing of tubes, sheets and rods.

AGENCIES:
Larmuth Bros.
Manchester
Rosenberg & Co.
Berlin

CHARLES F. KENWORTHY
Incorporated
Waterbury, Conn.

SOLE U. S. AGENTS
Equipment for Wire Insulating Plants
For General Engineering Co.'s Ejectaire and Vacuum

WIRE
& WIRE PRODUCTS

Vol. 2 FEBRUARY, 1927 No. 2

Rod Cleaning and Coating

Part I

Important information on acids and vats in the treatment of high and low carbon steels

By L. D. Granger
Wickwire Spencer Steel Co.

IT is not at all incorrect to say that wire is "made" in the cleaning house. Here is performed the first operation on rods; here the sensitive steel is first brought into contact with that necessary evil of the wire drawing art—acid. If cleaning is well done, the wire-drawer has little trouble; if poorly done his job is impossible.

Let us now see what conditions we must overcome and next how we shall meet them.

Rods coming from the rolling mills are covered with a more or less closely adherent black scale, formed by contact of air with the glowing steel. Chemically this may be FeO, Fe_2O_3, Fe_3O_4, or a combination of them, depending upon the temperatures at which they may have been formed. As a general rule, scale is hard, black and brittle, and also only slightly soluble in the ordinary acids. Every trace of it must be removed before coating, as otherwise the dies would be badly damaged, and scratched or cut out wire produced. From this fact arises the first general axiom in the book of the wire mill foreman. "In case of trouble in the wire mill, always check up the cleaning house first."

There are two methods of cleaning in general vogue. The usual method in this country is by the use of hot sulphuric acid. The English practice is to use "cold acid"—hydrochloric acid at relatively low temperatures.

Sulphuric Acid Cleaning

In this country we are fortunate in having an abundant supply of cheap sulphuric acid as a by-product of various manufacturing processes—ore roasting, fertilizers, etc. This acid is shipped either as a 60° chamber acid, or in a 66° concentrated form. Both concentrations are shipped in iron containers and may be stored in iron tanks for the use of the wire mill.

From the storage tanks, the acid is conveyed to various types of service boxes by iron or lead pipes or lead lined iron pipes, fitted with lead lined or composition valves.

As the cost or statistical department is usually very much interested in the amount of acid used per ton of rods cleaned, some method of measuring and recording should be provided. Various methods have been adopted, but perhaps the most satisfactory is to provide a lead lined box of a capacity suitable to add about one percent by weight of H_2SO_4 to the cleaning vat. Pipes lead from the bottom of this box to each vat, and plugs are inserted into the holes, so that, by the removal of the proper plug, a "box" of acid may be measured and sent into any one vat. In case this is too great an addition at one time, half a "box" may be added. The number of "boxes" used is chalked down by the acid man, and the record turned in to the scale clerk at the end of the day. It is desirable to have an intermediate service tank between the acid tanks and the measuring boxes, of sufficient size to handle the acid for one days cleaning. This may be measured daily by the scale clerk, to check the acid consumption reported by the various cranes, and then filled, and kept under lock and key to avoid discrepancies and inventory adjustments at the end of the month.

The design of cleaning vats and the number required vary, of course, with the production desired in the mill. The limiting "circle" which can conveniently be handled requires a

Old fashioned cleaning house showing water-operated grasshopper crane.

crane with a working radius of 18 feet which will serve 5 oval acid vats each accomodating two pins of rods, a sulling rack, a washing vat, and two lime vats. These last are necessary for a custom mill, but for a fence or nail mill where only one type of coating is used, one coating vat will suffice. The average amount of No. 5 rods which this crane will handle is about 125 tons in 24 hours.

When a mill handles large quantities of the same stock, as for instance a fence or nail mill, two cranes are often hooked together with a continuous sulling rack. The first crane carries from 4 to 5 acid vats and a washing vat. The rods are cleaned, washed, and deposited on the sulling rack, which carries them slowly to the second crane. Here they are taken by a second operator who may dip in acid to remove the sull if a bright finish is desired, or may coat immediately over the sull. By this combination, one oufit may produce up to 300 tons in 24 hours, with a comparatively small labor charge.

Type of Crane

Small installations may be served satisfactorily by a grasshopper crane operated by water, but for the larger installations where speed is essential for production, steam cranes are necessary. An extended description of these and of most of the equipment for cleaning is unnecessary here, as conditions vary greatly, and manufacturers are always glad to furnish the details. There are several installations of straight-line runways and traveling cranes in existence, but for all around work even the most modern mills stick to the circle of vats.

Shape of Vat

There may be said to be four general types of vats in use, round, oval, square and half round. The last named has a rectangular plan view, and a semicircular end elevation, shaped to fit the rod coil used. This vat has the virtue of using a smaller amount of solution and has proven entirely successful in several installations.

The dimensions of acid vats vary widely with local conditions, and depend upon distances between hangers of yokes, and whether one or two pins are cleaned in a vat.

A typical medium tonnage mill has a steam crane serving a circle 16 ft. in diameter. There are four oval acid tubs 5′ x 7′ x 55″, each taking two pins of rods; two lime coating vats, for heavy and light lime coats, a sulling rack, and a rinsing tub. A production of approximately 200,000 lbs. of rods is expected per 24 hours.

The distance between hangers is 44″, and a weight of 2000 lbs. of rods is carried on each yoke. Actual data from different mills indicate that the capacity of a yoke varies from 35 to 50 pounds per inch of distance between hangers.

The weight of rods carried on a yoke, however, is largely dependent upon the ease with which the rods will clean. Rods rolled on a Morgan mill generally finish rather hot, and therefore have a heavy adherent scale. This may be loosened by the use of water on the reels if other considerations allow it, and the cleaning made much faster, and the amount of acid reduced. Garrett mill rods, on the other hand finish at a lower temperature, and the scale therefore is lighter and cleaning less difficult. Bessemer stock also seems to clean quicker than Basic.

As the typical mill mentioned handles a large variety of stocks and sizes, the expected production is somewhat less than would be secured by a straight nail or fence mill. Also, separate vats are maintained for high and low carbons, as it is not good practice to clean the two grades in the same vats.

After the normal time in the acid bath, (10 to 20 min.), the pin of rods is raised, washed off thoroughly with a stream of water at a pressure of not less than 150 lbs. per sq. in., and then either coated directly or allowed to stand in a spray of water until the rods have taken on a wet rust, which acts as a very good lubricant for three and four draft work. The coating is performed by dipping in a bath of slacked lime, at about 140° F. temperature, heavy for many drafts, and light for one or two draft work. The rods are then hung on yokes or loaded on buggies and passed through the dry houses in which the harmful effects of the acid are removed.

Crew Required for Cleaning

This again varies largely with local conditions. If rods are stacked in a yard and must be brought in by tractor or otherwise, the crew will be increased, and whether this is charged to cleaning or rod handling is a matter of local accounting.

In general the crane proper requires one or two "boxmen" who place the rod coils in po-

sition for the yoke to be placed and insert the pin, one crane man or cleaner, one acid man, who replenishes acid and lime, and does the "odd jobs," and two or more "wet wheelers" who truck the cleaned material from crane to dry house.

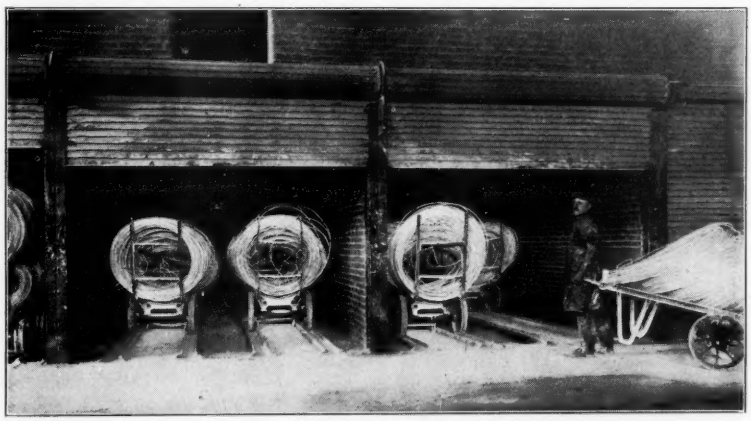
Percentage of acid, and method of Testing. Temperature.

LOW CARBON STEELS: Ordinary practice calls for a percentage of 3 to 3½% of free H_2SO_4 by weight, and a temperature of about 180° F. Both higher and lower percentages are used according to local conditions, but the figures mentioned produce good results, and with fair economy. Heating above 180° is expensive. While it does speed up the cleaning somewhat, the loss of acid and the greater discomfort of the operators through excessive fumes more than offset the increased speed. It is far better to increase the acid percentage slightly if a sharper cleaning is desired. It is claimed that 15% of the acid may be wasted by too high temperatures.

HIGH CARBON STEELS: On account of the tendency of high carbon steels to form a black smut, greater care must be taken in their cleaning. The acidity in general must be lower, and the temperature not over 160° F. A slow, low acid, low temperature cleaning is much to be preferred for high carbons, while low carbons can stand a sharper acid, and a higher temperature. High carbons should not be cleaned in vats in which low carbons have previously been cleaned. If the same vats must be used, the high carbons should be cleaned first, and the vats "run down" on the lower carbons.

High carbons are often coated with a "copper-lime" coat for ease in drawing. This is done by dipping the cleaned and washed rods into a vat containing a solution of copper sulphate of about 10° Be. density, and about ½-1% of free H_2SO_4. One or two dips in this, then into a cold lime bath, and baking at a lower temperature produces a coating which gives the familiar dark brown color of rope wire, enables greater reductions to be made, and a smoother and rounder wire finished. A combination of a copper coat and a sull is often used on high carbons, and makes a very fine coating.

High carbons must be baked more thoroughly than low carbons, as the stock is much more susceptible to the brittling effects of the acid.



Dry house showing cleaned and lime coated rods loaded on buggies, and placed in house for baking.

The cleaning baths should be tested for acidity at regular intervals (2 to 3 hrs.), by a special man if the mill is large enough, and daily charts sent to the Superintendent. Careful attention to this detail will mean very substantial savings in the course of a year. Full details for making up testing solution and routine of testing will be found at the end of this article.

The second part of this article will appear in the March issue.

Finds Most Accidents Occur in Small Shops

THAT thousands of small shops, factories and industrial establishments are making no real effort to conserve the lives and limbs of their employees is the belief of W. Dean Keefer, director of the industrial division of the National Safety Council.

A survey made by special investigators representing the accident prevention institution discloses that small workshops have more accidents than larger establishments. For instance, a group of ten factories with a total of 1,000 workers has a worse accident record than one large plant with the same number of employees.

Analysis of the reports received from the investigators, who visited 299 small plants in Michigan, Illinois, Indiana, Kentucky, Ohio and Rhode Island, reveals the following fundamental unfavorable facts:

The only records that are kept of accidents that occur in small plants appear to be those made out for the insurance companies and state officials. The average small plant executive declares and actually believes he has no accidents in his plant. He is too busy to pay any attention to accident prevention.

Small plants pay their compensation insurance premiums and, after complying with the demands of the insurance companies and state officials, assume they have no further responsibility to safeguard their employees.

These executives do not realize that accidents cost them approximately four times as much as they cost the insurance carriers.

As a result of the facts brought out by the inquiry, which is believed to reflect the situation throughout the country, the National Safety Council is going to launch a campaign to interest particularly small plants in organized accident prevention activities.

Wire for Steel Ropes

A review of British investigation on the characteristics of rope-wire with special reference to grain size

THE selection of wire for the manufacture of steel cable is manifestly a process that increase of knowledge is making increasingly difficult. The second report of the Wire Ropes Research Committee of the Institution of Mechanical Engineers, published within the last two years, illustrated how variable may be the results, which, under different conditions of manufacture and use, may be given by ropes made from wires of apparently identical composition and structure. The problems so suggested have not been solved completely, and behind them lies the quite independent series of complexities that may arise from variations in the chemical composition of the wires, and in the heat treatment and mechanical working that they may have undergone. Not so long ago such circumstances would have led to the formation and exploitation of trade secrets, which imperfect knowledge can do much to foster. Trade secrets, though even now not wholly unknown, are less fashionable than they were. Many industries have come to the conviction that more can be gained by exchanging information than by concealing it, and among these the wire-drawing industry is taking a conspicuous place. The most recent text-book on the subject has been written by the head of the metallurgical department of a well-known wire-mill, whose research laboratories also have been placed repeatedly at the disposal of other investigators. Results, for example, obtained by Dr. E. M. Horsburgh from tests so made have more than once appeared in ENGINEERING*; and at the recent meeting of the Institution of Engineers and Shipbuilders in Scotland, Dr. Horsburgh presented a further contribution from similar investigations, which well indicates the sort of problem that arises on the choice of wires for use in the manufacture of steel ropes.†

*Engineering, cxii, page 707; and cxiv, page 759.

Large-grained Mild-steel Wire

The chief aim of the experiments in question was to detect any difference in properties between large-grained mild steel wire and rope wire of a usual composition and structure. According to general practice, rope wire has a fairly high carbon content, and after having been "patented"—that is, in effect, normalised at an extra high temperature and cooled slowly, so as to produce a fine structure of sorbite, or disseminated pearlite, in large grains of ferrite—is cold drawn through one or more passes, and becomes hard, tough and strong. The mild-steel wire is said to have been very low in carbon, and after having been given the desired large grain by suitable tensile strain and heat treatment, was drawn through one or more passes, so as to remove the circumferential envelope of fine grains that the process had left. Under tensile stress the distortion of the individual grains could be followed microscopically.

In the March issue

of

Wire & Wire Products

An article on certain extraordinary developments in wire drawing.

†"Large-grained Steel Wire and a Comparison with Rope Wire," read before the Institution of Engineers and Shipbuilders in Scotland, on October 5, 1926.

Swaging Strengthens Large Grained Wire

Among the various tests to which these wires were subjected, special attention is drawn to one, in which the wires were swaged at one section by hand-tapping with an ordinary engineer's hammer, the wire being rotated slightly at each stroke, so that it should be deformed as little as possible. The large grained wire showed surface marking from the swaging, while the rope wire did not; but when the wires were broken by tensile loading, the large-grained wire never broke at the swaged section, however small a length was taken for the test, while the rope wire broke nowhere else, and at a sensibly lower load than a corresponding unswaged wire. It was evident, therefore, that the swaging had strengthened the large-grained wire and weakened the rope wire. By an interesting discussion developed in the course of his paper, Dr. Horsburgh connects this result with the visible structures of the wires and with their probable atomic constitution, both in the mass and at the boundaries of the grains, offers an explanation of the behaviour of the two wires. He also derives from his results, viewed in the light of this discussion, some practical suggestions as to the choice of wire for ropes, which he puts forward with the reservation that, by themselves, the tests would not justify final conclusions, though these are supported by some general impressions derived from rope-wire testing. Dr. Horsburgh has conducted extensive investigations in the field of wire ropes.

Deformability Important In Wire Rope

Substantially, these conclusions amount to this. The ordinary practice of wire-rope making uses steel that has been so drawn as to exhibit something like its greatest hardness and tensile strength. But this quality, though it may be suitable for plough steel, is not from all points of view the best for winding ropes in general. High tenacity is doubtless the chief essential in winding ropes, and for this reason ropes made of the hardest and strongest steel have often been thought the best. In use, however, durability and reliability under shock are almost as important as strength. A straight, steady pull is far from being the only stress to which a rope is subjected, or ultimately the most dangerous. The examination of discarded haulage ropes may show that they stand nearly the original tensile breaking load, although bending and torsion tests prove that the individual wires are worn out, and may for instance fail to stand a single complete bend. This seems to point to the desirability of using a wire with a little less than the maximum tensile strength and some degree of deformability, in which the sacrifice of a certain amount of strength would be accompanied by a slight ability to yield under shock, without parting. A fruitful suggestion was made some time ago by Mr. Brearley that a hardened steel possessed in its hardness a quality which could be exchanged for toughness *pro rata*, according to the extent of tempering. Dr. Horsburgh makes a somewhat analogous suggestion in regard to the effect of cold working, from which wire derives its exceptional hardness and strength. Roughly speaking, he says, a steel wire of definite composition and structure can undergo a certain amount of work; and if that amount has all been applied by the draw plate, none is left for the accommodation that is necessary when the wire is put into service in a rope.

Suggested Experiments on Rope Wire

The actual structure most desirable in a rope wire seems therefore to be a compromise. The fine sorbitic structure must doubtless be preserved, but the size of grain must depend on the use to which the wire is to be put. Too large a grain may weaken the wire unduly against tensile stress or shock. Mr. A. T. Adam has pointed out that the larger grains give longer fibres with, as a rule, better torsion tests, while smaller grains give shorter fibres and generally a better bend test. For the time being no data seem to be available to decide the actual sizes that should be preferred for various purposes. To some degree, the extent to which a rope yields under shock—and the same is true of twist and bend—is affected by its lay, but more information will be required before the respective parts played by the lay of the rope and the structure of its constituent wires can be precisely defined. As Dr. Horsburgh observes, it would be very instructive if the life history of ropes could be correlated with the formation of the wire, but the necessary data are not available at present. The effect, however, of his present paper, which is rather descriptive and suggestive than quantitative, is to indicate that there is room for some definite and practicable experiments, in which series of similar wires, differing only in single properties, such for instance as size of grain, might be tested in parallel. The value of suggestive experiment, such as the present paper discloses, is not disparaged by remembering that a broader basis of information is now desirable for practical purposes, and indeed for the closer definition of even theoretical conclusions.

(Reprinted from Engineering, Oct. 29, 1926)

Wire Market in Baltimore

BALTIMORE, Md., Jan. '27 (UTPS) — While local manufacturers of galvanized wire goods report they are doing a satisfactory volume of business, it is becoming more apparent that copper, brass and bronze wire goods, especially the former are making inroads on the galvanized goods. The copper is always preferred where price is not a deterrent, the same is also true of the brass and bronze.

Business in wire goods and allied lines for the year 1926 was satisfactory, according to several representative wire manufacturers and dealers in this market. In some instances it only compared favorably with the volume of business done during the preceding year, while in others it was better. While it is still a little early to prognosticate for the current year, basing of course the prognostication on the volume of business done to date, indications are, however, that it will be better than the year just ended, at least it is expected to be as good.

The orders booked to date have been of a satisfactory character. They have included a wide range of goods, but principally wire fence, lamp frames, grates and similar or allied items. Dealers are experiencing considerable activity in wire fencing, both galvanized and zink in various widths and lengths, as well as thickness. Building activity is helping movements in this class of goods, as the majority of homes here are of the row variety, and wire fencing is being employed to separate each yard. Nearby developments are also proving an asset to wire fencing.

The Peoples Hardware Inc., dealers in wire goods who have opened a branch store at 817 Pennsylvania Ave., report a large demand for various fabricated wire products.

Why a Price Salesman Ca

The Difference Between Selling by Installation Compels Us to Train

As told to a Member of the

By John

General Manager, The Cyclone

EVERYWHERE we are hearing the complaint that "things aren't as good as they used to be." Housewives long audibly for the good old days when a pie tin lasted long enough to make it worth their while to go down to the store after it. Their husbands grow irritated when suits wear out inside of four or five months, remembering that they used to be good for a year anyway.

The housewife doesn't take into consideration the fact that she is now buying three pie tins for a dime at the five-and-ten-cent store where she formerly paid twenty cents apiece for them. Her husband seems to forget there was a time when he wasn't satisfied unless he bought his suits at the best clothing establishment in town, while now he hurries in to one of the "upstairs" men's stores and gets a coat and vest and two pairs of trousers for some $26.75.

And both of them are overlooking the point that, by purchasing articles of inferior quality and replacing them oftener, actually they are spending more money and getting less satisfaction than if they bought high-grade goods in the first place.

The fault, of course, lies at the door of manufacturers who build merchandise to sell, and distributors who sell on price alone. The public has been taught to base its selections on cost rather than quality, and the majority of salesmen are schooled to make price one of their strongest sales appeals.

A Price Salesman Can't Sell Cyclone Fence

That is the reason why the Cyclone Fence Company has found its practically impossible to take salesmen from other lines of business and teach them to sell its product satisfactorily. A price salesman simply can't sell Cyclone fence, because he must not only sell the fence, but must also sell the installation, the company's engineering service, and the guarantee of a perfect and satisfactory completed job. Grocery jobbers' salesmen, or men who sell automobiles or shoes, seldom make good Cyclone salesmen because they are accustomed to sell by the price per gross, dozen, box or unit. It is difficult to teach them to sell the installation, the engineering service, and the completed job along with the merchandise. The company's only alternative, therefore, is to select men who have had little or no previous sales experience and bring them up in its own way of selling.

Fence Products

There are two principal Cyclone products: the lawn fence, which is sold in rolls through jobbers and dealers in much the same manner as other articles, and the chain-link fence, which is sold direct to users according to their individual specifications. The lawn fence line is built chiefly to meet the calls of buyers who use it in small quanties for miscellaneous purposes and buy it at hardware stores as it is needed. It is handled by jobbers because few dealers are in a position to buy in carload lots, and it is easier and cheaper to ship orders for two or three rolls at a time from a distributing point than direct from the factory.

It is the chain-link fence, known as "Property Protection Fence," in which by far the greater share of the company's business is done. The buyers are industrial and manufacturing plants, railroads, such institutions as hospitals, schools, orphanages, cemeteries, sanitariums and asylums, public parks and buildings, private estates, and similar enterprises. Every sale made to such a concern involves the preparation of a special set of blue prints covering it, as chain-link fences are literally "made to order" for each buyer.

While lawn fence is distinctly not a price product, it is priced by the roll or foot the same as anything else of a like nature, and sales practices which are successful in selling bulk fence to hardware dealers through the jobbers are not at all applicable to selling a big installation to a factory. By way of showing the difference in the methods employed to sell the two lines, the salesmen who handle sales to jobbers, while they are a high type of men, are seldom qualified to sell to the big users, and those who specialize in chain-link fence do not attempt to make sales for the jobber dealer-department of the business. There are only a few salesmen to take care of lawn fence sales compared with the number who sell chain-link fence direct to users, covering all parts of the country and working out of branches in the principal cities.

Prefer College Men.

According to the experience of this company, the men who have worked their way through college make the most desirable salesmen. This distinction is important not because the men have gathered specialized knowledge from their studies, but because they are mentally disciplined; they are usually quicker to grasp whatever problems may confront them. The fact that they have made their own living while attending school, too, indicates that they have learned the meaning of work and money, that they are more likely to appreciate their jobs and their salaries.

(*Reprinted from Sales Management, Oct. 16, 1926)

nnot Sell Cyclone Fence

the Unit Price and by the Complete New Men in Our Own Sales Practice

Dartnell Editorial Staff *

W. Meaker

Fence Company, Waukegan, Ill.

Making of Cyclone Salesmen

There is a great deal of information about the construction and installation of fences a Cyclone salesman must know, but he is not expected to have that knowledge when he is employed. He is expected, however, to be the type of man who can learn quickly and thoroughly and who will apply himself in earnest to studying the product.

As soon as a new man is employed—which, if he is a college man, usually is shortly after he has completed his college course and has been chosen from among many applicants recommended by college faculties or business departments over the country—he is brought to the factory and set to work in the office. By the time he has been in the office two or three weeks, he is pretty well acquainted with the way orders are handled and how specifications are made out for each individual job, and he has learned in a general way the policies and methods of the company.

The Salesman's Training Course

He is next placed in the factory, where he becomes familiar with manufacturing processes, knows how the fence is made, what materials go into it, and which features are exclusive with his product, and finally he is qualified to explain why the best possible methods of manufacture add to the life and serviceability of a Cyclone fence. By this time he has probably spent from a month to six weeks at one of the company's four mills. Then comes the most difficult part in his training for a salesman's position.

For the next three months he does the hardest kind of manual labor working with a construction crew. Since the Cyclone Fence Company emphasizes the point that it takes all fence problems off the shoulders of buyers, including installation, it maintains these construction crews out of each of its branches to do nothing but put up fences. There are fourteen of them in the city of Chicago alone, for example, and the problem is not how to keep them busy, but how to keep them from falling too far behind the sales.

Direct Experience

Digging post-holes, stretching wire, mixing and pouring concrete and carrying pipe all are on the salesman's daily program for these three months. One of the important parts of his work will be to analyze his prospects' needs and specify the materials which will meet their particular circumstances, so what he is learning about types of soil, ground plans, grades, foundations and other things relating to installations while working with the construction gang will be of immense value to him later.

Bed rock may be near the surface of the ground on one job, while on the next one perhaps a fence will have to be put up on sandy soil; he must know how to take these different factors into consideration when making out specifications. Hills, railroad tracks, roadways, the position of gates and entrances all have an important bearing on the facts he must send in to the company's engineering department whenever he completes a sale. His computations are carefully checked by expert engineers and draughtsmen at the home office, who lay them out to scale, prepare the blueprints and delegate a construction crew to get on the job.

One of the best things these three months do for young salesmen, aside from teaching them the actual details of the business, is to separate the capable workers from those who are neither particularly energetic nor interested. If a man goes through with three months' experience as a day laborer, it is pretty certain that he possesses the qualities of character and ambition which will enable him to develop into a successful salesman. The necessity for this intensive training is another reason why the college man is especially adapted to selling Cyclone fence.

From the Ground Up

A man who has had several years' experience as a salesman of some other line would consider it beneath his dignity to waste four months of his life, as he would probably describe it, building fences. He would be so confident of his ability to sell fences without this special training, that he could not put his heart into it. Even a man who had never sold anything before would be inclined to regard it as menial and unnecessary if he did not have that vision and imagination which is drilled into most college men and makes it possible for them to see through the thing they are doing to the goal they hope to reach. This, it seems, is one of the best recommendations for college-trained men; they have been taught to realize that a thorough preparation is essential, and they are willing to prepare themselves even at considerable inconvenience.

Since the first of the year two men who undertook to become salesmen dropped out during the period they were expected to work with the construction gang. It was fortunate for both the company and for themselves that they did so. They demonstrated their own unfitness for the work, and it was far better that they discovered

it before they began to sell than afterward.

Meeting Price Arguments In Selling Fence

In spite of the strenuous life that candidates for salesmen's posts live during those three months, however, it is during their first three months as salesmen that they are subject to the greatest temptation for becoming discouraged. Selling a quality fence which is priced higher than most competitive products is a great deal like selling any other quality article. Every sale made is constructive in the sense that the prospect either must be made to see the need for any kind of a fence, or must be shown where the better, more expensive product is really more satisfactory, and much cheaper, in the end.

It is an every-day occurrence for a Cyclone salesman to interview a prospect who had made up his mind that a fence was just a fence anyway, so he might just as well buy as inexpensively as he could. Frequently buyers add to his problem by putting the matter on a strictly competitive basis and getting bids from all companies making fence. After a young salesman has lost several sales because his prices were a little higher than his rival's or because he merely left specifications and prices with the buyer and waited for the outcome, he is inclined to become pessimistic.

Inside of three months, though, if he sticks, he has learned that his fence must be sold, and he really tries to sell it. As a general thing, then, the man who lasts out the first three months on the construction gang, and the next three months meeting prospects on their own ground, is a salesman who looks upon his job as a permanent one and within a short time is ranked among the producers.

It is the natural thing, of course, for buyers to regard their fencing requirements as a good place to cut down expenses. It is not the fence itself that Cyclone salesmen have to sell so much as it is the idea of protection, safety, appearance and value that go with the possession of a high-quality product.

Frequently sales are made against odds and at higher prices than are offered by competitors, by demonstrating to the buyers' engineers that a superior product is the better investment. A recent experience will serve to illustrate. The engineers of the buyer were quite inclined to place the order with a competitor, who claimed special superiority for his product. Reports of metallurgists and chemists were presented to prove the superiority of the Cyclone product and, convinced of the truth of these published reports, the buyer changed his attitude completely and the Cyclone salesman secured the order at a material increase in price.

The second part of the article on

Rod Cleaning and Coating

BY L. D. GRANGER

Chief Metallurgist of Wickwire Spencer Steel Co.,

will appear in the March issue of Wire & Wire Products.

The Fence Salesman's Investment Appeal

Oue of the strongest appeals, and one which seldom occurs to the average person, is the matter of creating a favorable impression. A feature of wire fence is the element of visibility. It has been found that the premises about factories or institutions are kept more clean and attractive when outsiders can see in than when their view is obstructed by a solid fence. The workmen and caretakers have more pride in cleaning out the corners and preventing rubbish from piling up if they know the plant and grounds are visible from the outside.

Another effective sales argument relates to controlling exits and thereby preventing employees from carrying articles away or leaving the plant at odd hours. Fenced property is safer from trespassers; being kept cleaner and more attractive creates a more favorable impression among any of a plant's customers who may have occasion to visit it, and the better the fence, the longer it will be before it may have to be replaced.

Cashing the Inquiry on Fence Advertisements

These are the points stressed by a Cyclone salesman when faced with the objection of a buyer that there is no use spending any more money than is strictly necessary to put up a fence. Some buyers, of course, are experienced enough in mechanical work to appreciate the construction features of the product. They have to be sold on the strength of the foundation, the durability of the posts and wire, the advantages of barbed wire arms and other technical questions. Then there are other buyers who cannot appreciate the details of construction, and the only way to reach them is by using the appeals which emphasize the more or less intangible benefits derived from the use of quality fence.

Probably the majority of sales are closed as the result of advertising leads. For a number of years the company ran keyed advertisements in general and trade magazines, and inquiries kept coming in so fast that a whole corps of office workers had to be maintained to keep a record of them. For the last two years, the advertisements have been unkeyed, the company having determined what advertising mediums bring best results, and while the volume of inquiries may have fallen off a trifle, they are a great deal more select and the number which later develop into sales is greater than when they were keyed.

Accident Prevention in Wire Mills

By M. A. Hall

Consulting Mechanical Engineer, White Plains, N. Y.

IN THE early days of wire production, tonnage was the paramount issue. The sole thought was to produce more and more wire. The more that was produced, the more there was to sell and make a profit on. Production and works managers were inspired by the thought of keeping the wheels turning, keeping wire coming through, with little or no thought of the price paid in lives or limbs of workers.

Any kind of mechanical work in which metal is heated, worked rapidly while hot and as long as it remains hot, is bound to be dangerous work. Wiredraw was and is no exception. No one wanted men to be injured in the early days, no one wants them to be injured today. But in the early days, it was considered as one of the hazards of this hard rough industry, undesirable but a necessary and unpreventable evil.

Now, all that is changed.

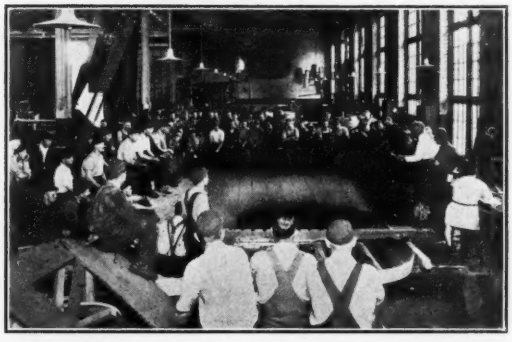
Activities were started to protect the workers. And once started, they rapidly proved their worth by preventing thousands of accidents, and saving tens of thousands from serious injury. They proved in a short time, that such accidents and injuries were not necessary and were preventable.

The American Steel & Wire Co. is a large and important factor in this safety work, in which many other wire companies have joined. Since the U. S. Steel Corp., of which Steel & Wire is a subsidiary, started its safety work in 1906, some 322,408 persons have been saved from disabling accidents up to and including 1925. There was a decrease of 80.07 per cent in this type of accident.

Yet, three to four times as much wire (by weight) was produced in the last year as in 1906. In short, leaders of the wire industries have found that accident prevention carefully planned and carried out was no handicap to production, in fact could be successful with greatly increased, even with multiplied production.

And from an economic standpoint, they have found that such accident prevention work actually paid a dividend. This was not a passive but an actual dollars and cents dividend. More safety work, better thought for and care of employees, produced more wire in a given period of time from the same or equivalent equipment.

To many accident prevention consists of putting metal guards around belts, gears, and similar points of danger, and little else. As a matter of fact, that is but one minor phase of the whole range of safety work. It will be profitable, perhaps, to outline this safety work.

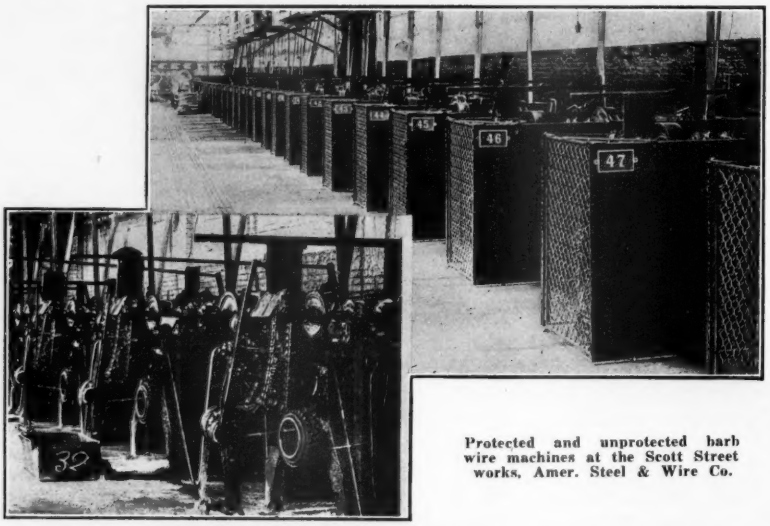


Departmental safety meeting, Waukegan Works, Amer. Steel & Wire Co.

Accident prevention or safety is promoted by

1. Enclosing, protecting and similar devices.
2. Education along safety lines.
3. Production of clear brains and physical betterment.
4. Plant hospitals, first-aid stations, medical nursing and dental clinics, sanitation, etc.
5. Plant restaurants, clubs, meetings, etc.
6. Bulletins, printed matter, etc.
7. Gardens, playgrounds, athletic fields, etc.
8. Plant safety organizations.

Before looking into these in detail, it may be well to quote from a well-known authority on this subject. Charles L. Close, Manager of the Bureau of Safety, Sanitation and Welfare of the United States Steel Corp., states, in his booklet on Welfare Work in the Steel Industry, "Experience has now taught us that fully 90 per cent of industrial accidents can be eliminated if steps are taken to organize the work properly. It has also taught us that 80 per cent of all accidents are attributable to thoughtlessness or carelessness on the part of the workman himself or his fellow workmen. It is evident, therefore, that considerable attention must be given to educational measures whereby the workmen may be taught the fundamental principles upon which successful accident prevention is based and to the inculcation of habits of care and forethought to overcome careless habits."



Protected and unprotected barb wire machines at the Scott Street works, Amer. Steel & Wire Co.

Machine guards, usually of metal, play a large part in enclosing, protecting and similar devices. These are light sheet metal or metal netting structures which are built around those parts of the machine which from their very nature present accident hazards, and more especially those which are of such a nature as to require little or no care or attention.

Thus, when machines are driven by belt, the lower end and the pulley there may be enclosed. When driven by gears, into which fingers, a hand, or clothing might be thrust by accident, they are similarly and as a rule, completely enclosed. When machines are driven by electrical motor, the points where a person might get a shock are covered.

Presses, drop hammers, shears, cutting-off machines and the like have the cutting, pressing or forming edges protected. As a rule this is so arranged that the power can not be turned on until the operators hands arms or other parts of his body are away from the dangerous edges.

In the barbed wire machines, shown herewith, it has been possible to enclose the entire machine with the exception of the entering end, where the wire is fed in, and the outlet end where the rolls of finished wire are formed.

Besides physical safeguards of this type, it has been found possible to devise standards of method and operation, safety specifications of plant construction, and safety specifications for purchase, installation and operation of machinery and equipment. In this way, all the safety work has been made cumulative. The new machine of today was designed from the standpoint of an advance over yesterday's safety.

Safety committees, to be considered later, make surveys with a view of ascertaining hazardous machinery or conditions, and offering recomendations for their correction. This work always shows progress so that machines deemed safe yesterday are included in today's list for some form of safeguard.

Education Along Safety Lines

This has done as much perhaps, as all the safety guards. When the workers are educated to the dangerous processes and how to conduct these with a maximum of personal safety, when in short, the men are taught to think in terms of safety, the number of accidents drops sharply and stays at a low figure. By education along safety lines is meant this thinking in terms of safety.

It covers a broad field of activity, much of it at first not apparently relevant. Departmental meetings, general safety meetings, safety posters and bulletins, safety precepts printed on pay envelopes and elsewhere, safety literature other than these, motion pictures, and the like are all effective agents. But before these can be effective the workers must be taught to read and speak and understand English.

This leads into night schools, education and Americanization, and other so-called welfare work. Nevertheless, all this has a real and more or less direct influence on safety. A man who can not understand English can not heed safety notices in English. Such simple words as Notice, Danger can be translated into many tongues but these are limited in their effectiveness.

Production of Clear Brains and Physical Betterment

It will be apparent that the clear-minded man can be more nearly cognizant of danger in certain processes, and better able to avoid it than the less clear minded. Similarly, the man of good physique is better able to take care of himself safely than the weakling. This leads us into athletic teams, athletic fields, athletic clubs and the like, playgrounds, various diversions, sports and the like. A wholesome outdoor life has a tremendous effect upon mental and physical strength, both of which are promptly reflected in increased safety of operations, or put the other way round, in lessened accidents and increased output.

Any cost to the wire firm of these athletics and sports is more than offset by decreased cost of accidents and increased value of a greater output which results from these.

Plant Hospitals are necessary to take care of the accidents which do happen, first-aid stations to give more immediate attention to smaller happenings such as particles in the eye, splinters in the fingers, etc. Medical, nursing and dental clinics are useful and helpful along the same lines. No workman can be thinking safety and big output of wire if his whole attention is centered on aching teeth, indigestion, trouble or sickness at home, or

(*Continued on page 67*)

The Manufacture of Carbon Drill Rods of Small Diameter

By Edward Baker, B. S.
Superintendent, Webb Wire Works

THE use of Drill Rod has become so prevalent in the machine shop and in the automobile industry, that the general method of manufacture is at once of interest to the users of this class of material as well as to the trade.

The practice herewith described does not pretend to give the details of any one plant, but to give to the man who handles steel of different classes a composite of the methods employed in the great steel section, the Pittsburgh District.

Carbon steel of 1.10 or 1.25 per cent carbon is obtained in the hot rolled rod form, No. 5 gage. This constitutes the raw material for the small sized product.

The difference in temper carbon of the raw material makes a difference in the class of the finished product, the one of lesser carbon being cheaper when bought in quantities. The difference in price is due to the degree of supervision and care required in the manufacture, as the higher carbon material requires a little different processing and a little more care in manipulation than the lower carbon steel. It is important to understand also, that the finished product of the higher carbon requires more care in its manipulation in the tool room.

The rods are heated in a muffle furnace at a temperature of 1400 degrees Farenheit for approximately one half hour. At the end of this time, the red hot rods are pulled from the furnace and allowed to cool in the air on the floor.

This method of heating and cooling produces a scale on the rod.

The scale of course, can not be drawn into the product, but has to be removed. It, however, serves its purpose. Scale, it will be recalled, is an iron oxide, the iron coming from the rod itself and the oxygen from the air. Now it so happens that in the commercial rolling of steel into rods, the outside surface of the rod has a smaller carbon content than the central portion of the rod. As this is undesirable in drill rods, the outer surface must be removed. The scaling of the rod helps materially in the accomplishment of this removal.

When the rod has become cold, it is pickled in a solution of about ten percent sulphuric acid and ninety percent water. The length of time required for the removal of the scale from the rod by the acid depends upon the depth of scale, the strength of acid and the temperature of the acid bath. At times an hour is required for the total removal of the scale. The action of the acid seems to be to penetrate the scale, and there, underneath the scale form a salt and evolve hydrogen gas. The gas then crowds in between the layer of scale and the body of the steel, loosens the scale from the steel, and breaks it up so that it can be washed off with water. In order that this action take place throughout the entire length of the rod, which is in the form of a coil, the coil is opened up into a helix, so each individual turn is separated from the others.

After the breaking up of the scale by the action of the acid,

(*Continued on page 64*)

The Making of Diamond Dies

Part I

Diamond Mines

By F. Krause

WHEN speaking of diamonds, reference is usually made to cut diamonds or brilliants, but on closer consideration, it will be found that the majority of the diamonds mined are used for industrial purposes. The diamond consists of crystallized carbon and is harder than any other existing material, so that it cannot be scratched by even the hardest known steel. It is, however, very brittle. Diamonds can be worked with diamonds, of necessity, a tedious and slow process.

A typical diamond mine.

By intense heating in the absence of air, it is possible to transform diamond into carbonado. According to the present state of knowledge, the diamond was produced in the earth's interior under enormous pressure combined with intense heat, a process which, up to the present, has defied duplication, at least as far as diamonds of useful size are concerned.

Usually, the diamond occurs in nature in its regular form of an octatedral crystal. Its color, however, may be bluish white, yellow, light brown, grey or black. Stones with a reddish or green luster are known as phantasy diamonds. Flaws may be of numerous varieties, such as fractures, cracks, pores and colored specks.

On the scale of hardness, the diamond figures as 10, the relative hardness of sapphire, ruby, topaz, granite and agate being 9, 9, 8, 7, to 8 and 7 respectively. The specific weight is 3.5.

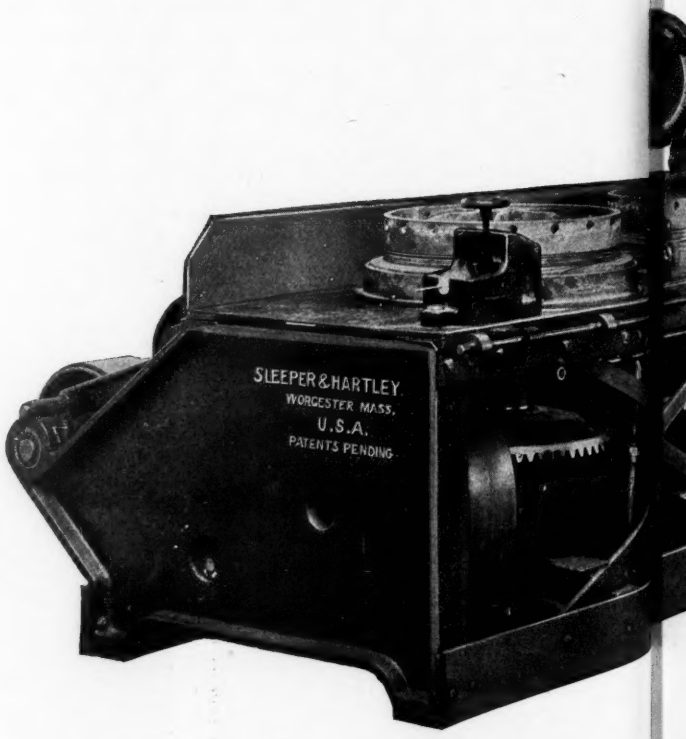
In the diamond industry, the

(*Continued on page 66*)

CONTINUOUS WIRE R

Sleeper & Hartley
TRADE MARK

Patented in United States of America and the Principal Foreign Countries



CONTINUOUS ROD FRA—M

Built with 3, 4 he

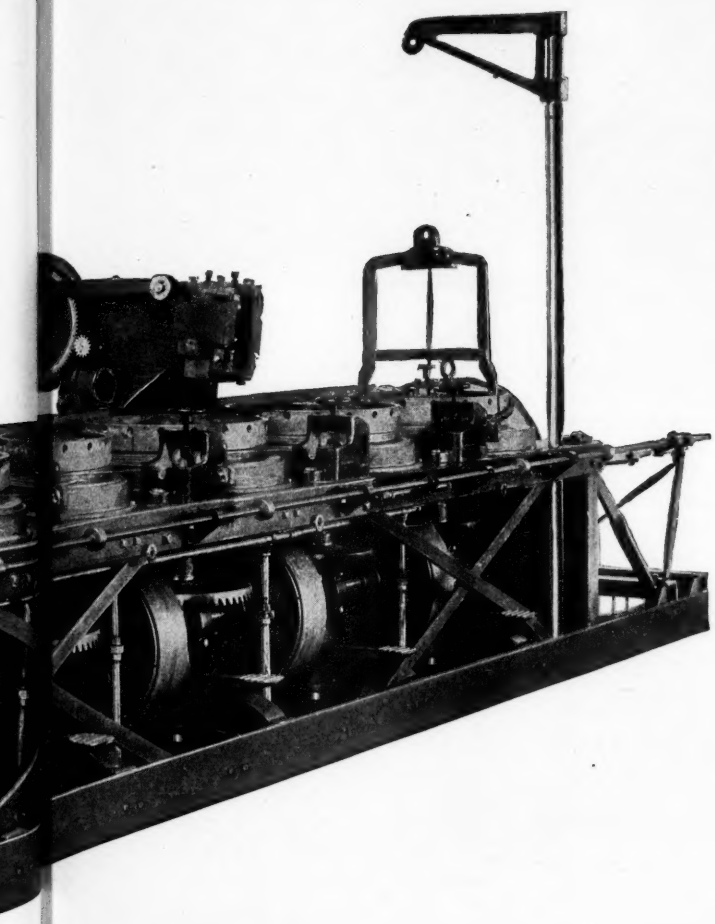
This machine is built without differential gearing of kin
of drawing heads These machines are put into proio

AGENTS: CHICAGO TERRITORY, Neff, Kohlbusch & Bissell, Inc.

WORCESTER SLEEPER &A

FOREIGN AGENTS AND REPRESENTATIVES: UNITED KINGDOM—Mr. Fredk. A. Perry, 63 Queen Victoria St., London. E. C. 4. FRANCE—Mr. Edgar Bloxham, 12 Rue du Delta, Paris. BELGIUM—Isbecque, Todd & Cie., 25-27 Boul. Emile Bockstael, Brussels.

RAWING MACHINERY



Sleeper & Hartley TRADE MARK

An All-Ball-Bearing Machine

High Production

Low Maintenance Costs

Machine shown here is set up to draw No. 5 to 15

Runs off 4170 lbs. in 10 hours

FRA—No. 5 to 14 or 15 WIRE
, 4 heads, as desired

of kind. Automatic compensation for variations in speed
proion immediately after making the motor connections.

&ARTLEY, Inc. MASS.

ITALY—Henry Coe & Clerici, Milan. AUSTRALIA AND NEW ZEALAND—Edwin Wood Pty., Ltd., Melbourne.
JAPAN—Andrews & George Co., Tokyo. SWEDEN AND FINLAND—Akt., Rylander & Asplunds, Stockholm.

EDITORIAL · IMPRESSIONS

Prospect and Retrospect

IT is a notable fact that while the increase in the value of the products of wire drawers in the United States from 1914 to 1921 was 22.1%, there was an increase of 96.5% from 1921 to 1923. Though exact figures are not readily available on the manufacturing census since 1923, we may confidently say that there has been a steady increase in output.

In the field of electrical manufactures, there has been a rapid increase in the consumption of copper. Most of this was in the form of wire. In 1921 the electrical manufacturers alone consumed 450 million lbs. of copper, while in the four years following this volume increased to 765 million lbs.

House wiring today offers an excellent opportunity for group action on the part of copper wire producers. Present installations in the average home are being overloaded, for most residence wiring is inadequate to meet the increased use of electric lights and appliances. By a properly conducted campaign, a very large and new market for copper could be opened. It is calculated that to add "two more branch circuits with 10 outlets each to the number of wired residences as of 1921, would turn up a new market for copper wire totalling 40,000,000 lbs. and a complete rewiring campaign would require well over 100,000,000 lbs. of copper."

The building trades in general might well receive greater attention from manufacturers of copper as well as iron and steel wire, than they have received in the past. While such extensive publicity can hardly be undertaken by individual firms, group advertising can go very far in that direction. It is reported that structural steel makers are uniting for the purpose of effecting organized publicity and the sheet metal manufacturers have long had a Trades Extension Committee in successful operation.

Might not the wire industry undertake methods which have proved profitable to similar trades?

Problems of Management

WIRE manufacture is definitely increasing and there is every reason to believe that the prosperity prevalent in the industry will continue in 1927. Not a small factor in this industrial boom is the very high production efficiency achieved by American plants. According to certain reports 1926 marked the greatest volume of production in the history of the country. American industry is learning intensive production and along with the large volume the past year showed an unprecedented degree of productivity per wage earner. The production end of the wire industry is very satisfactory.

One could hardly say as much for the distribution. The cost of distribution is always a large item in management but very little systematic work is being done to reduce it. Practically no attempt is made at thorough market studies and organized sales on extensive scale are sporadic.

New markets for old products and the manufacture of new fabricated wire products is another problem receiving less than its deserved attention. A careful study of new applications of wire would benefit the industry at large and is therefore best carried out under the auspices of an industrial association.

In general, the wire industry reveals a striking defect compared with other and even younger industries: the lack of adequate systematic research. What efforts have been made in this direction has been chiefly on machinery which is afterwards kept in strict secrecy much to the detriment of progress in the art. Little or no research work has been done on the products. The fear of increased overhead expenses and the unwillingness to engage in work that might benefit rival manufacturers is chiefly responsible for this condition.

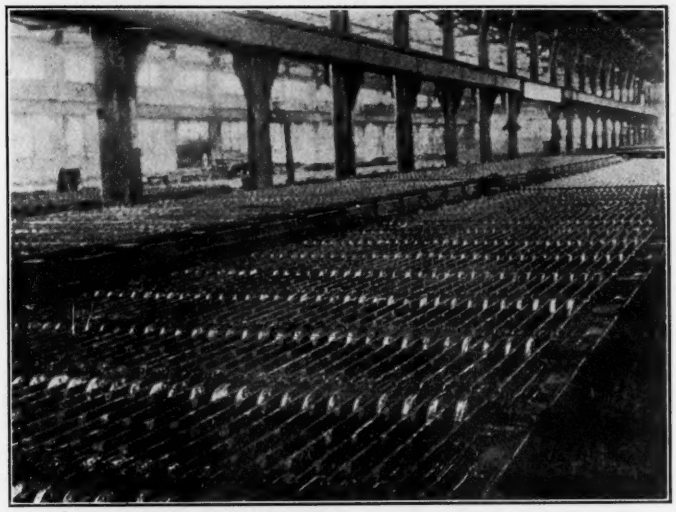
As to overhead expenses, it is difficult to lay down fixed rules. Not seldom a high overhead is more than compensated for by the resulting standard of manufacture and the confidence which such standards inspire in the consumer.

WIRE
& WIRE PRODUCTS

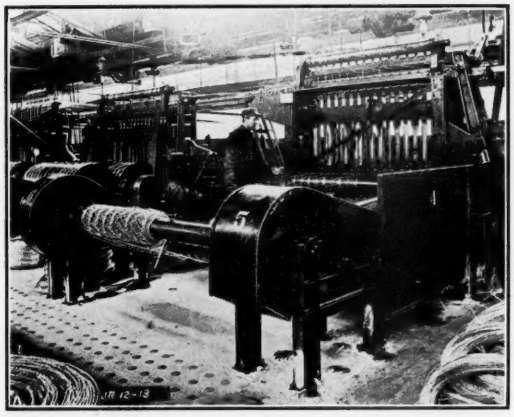
Selling Wire

ELSEWHERE in this issue we publish an article on the peculiar problems of salesmanship offered by certain wire products, in particular by the sale of wire fence. The subject so competently dealt with by Mr. Meaker throws much light on the methods of selling products which are sold to users according to individual specifications. In such cases the manufacturer is more than a source of staple product, he is a factor in the solution of certain technical problems confronting the user of wire. It is not merely a product but also service that is sold, and the firm which aims at rendering the highest quality service will—in addition to gaining a high reputation in the industry—materially contribute to the technical knowledge of the trade. Because it is this technical knowledge that is so often an essential element in the sale of wire and some wire products, that many companies require their salesmen to have thorough knowledge of the technique of the trade.

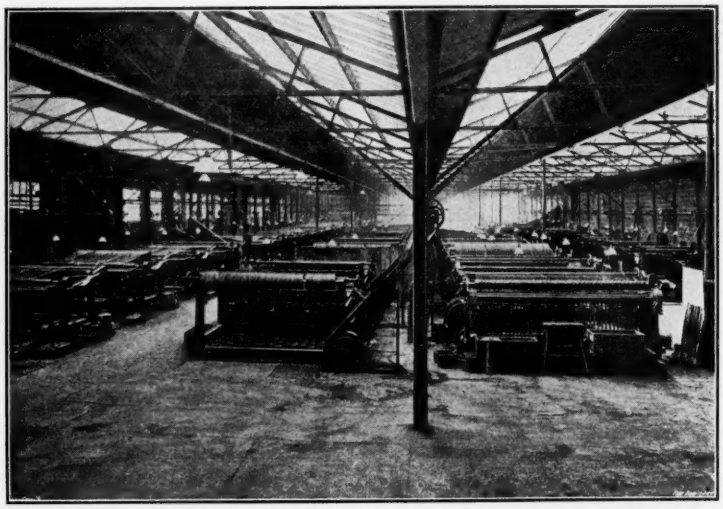
VIEWS OF THE WIRE WORLD



An unusual view of the tank house for electrolytic copper refining, at the U. S. Metals Refining Company.



View of fence department of the Rockdale Works, Amer. Steel & Wire Co., showing machinery properly guarded.



A British wire netting weaving shop.

If you have photographs of interest to the Wire industry, send them to Wire & Wire Products

BOOKS
For the Wire Industry

The Background of Wire-Drawing and Forming

ENGINEERING METALLURGY By B. Stoughton and A. Butts; 419 pages, McGraw Hill Book Co. New York, 1926.

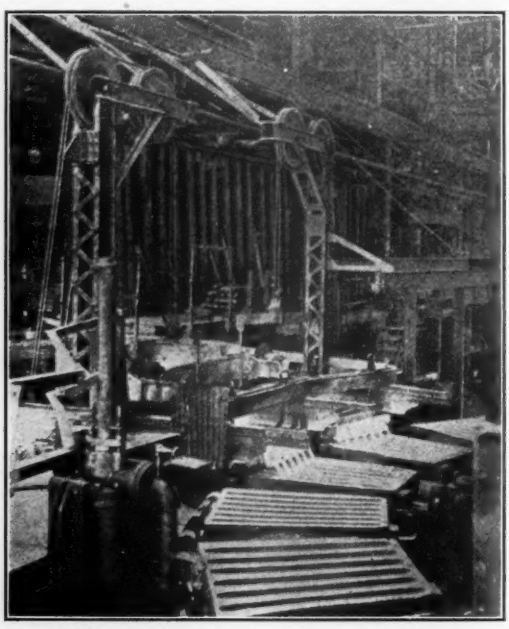
Reviewed By Eugene Grunstein.

THOSE who have read Professor Stoughton's earlier work on the Metallurgy of Iron and Steel, will welcome this less specialized volume with great interest. Here, Professor Stoughton addresses himself to the users of metals, those who use metals and alloys merely as raw materials for their factories. It should for that reason be of special value to engineers, metallurgists, chemists and plant executives of the wire industry.

Its subject, the extraction and refinement of metals, is treated in just sufficient detail to give the users of metals a better knowledge of the properties of metals, the effect of impurities and the suitable tests and specifications to be applied in different cases. A work of this type is indispensable in plants where metals are shaped and heat-treated. And the present volume has the special merit of a clear and simple style.

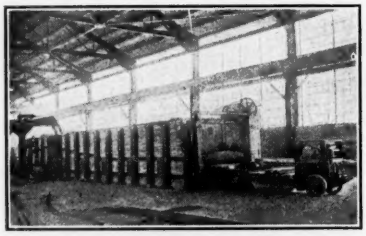
A specially interesting chapter is one on Adapting Metals and Alloys to Engineering Use in which means of adjusting properties for extrusion, rolling, wire drawing, etc., are discussed. Other subjects of importance include the properties and uses of non-ferrous metals, and that very urgent problem of corrosion and prevention. In the chapter on the latter subject, frequent reference is made to the book recently reviewed in these columns: Speller's *Corrosion, Causes and Prevention,* McGraw Hill, 1926.

The comprehensive nature of the work is well reflected by the broad interpretation their authors give to the metallurgy. This includes besides chemical metallurgy, physical metallurgy dealing with the nature, structure and physical properties, as well as mechanical metallurgy including the processes of working and shaping metals.



Casting copper wire to be drawn into wire bars. The pure copper is here cast into suitable shapes for the market. From Stoughton's Engineering Metallurgy.

The operations involved in the manufacture of wire and wire products while not specifically treated are immeasurably clarified by the more general discussion of metals in this book.



Bar heating furnace for heating copper wire bars preparatory to rolling. From Stoughton's Engineering Metallurgy.

Ventures in History

IRON IN ANTIQUITY By J. Newton Friend, 207 pages; G. B. Lippincott Co., Philadelphia, 1926.

TECHNOLOGY, among the many enterprises of civilization, has suffered from a lack of proper historical treatment. Too much has its progressive character been stressed, and not enough of its past development known. By the light of the past, the commonplaces of modern science assume a new and fascinating aspect and their history reveals a rich source of culture and human interest.

With such human interest, Dr. Friend has, in this volume, vividly embroidered his wide scientific scholarship. He has shown that iron, in an age which has been peculiarly characterized by it, can be a subject of more than technical interest. He has traced the story of iron in its human setting, and has read widely in the literature of the world in search of historical material. The result is illuminating and highly entertaining.

The book includes a treatment of iron as ornament and currency. The part it has played in Greek and Roman civilization is told, and records of its use in the Sagas are cited. Iron in India is treated briefly but vividly, and the story continues in Egypt, Palestine, Mesopotamia, Africa, China and Japan. Throughout, the work is characterized by a judicious balance between technical and

lay material. It is a book that all may read and understand and yet will offer valuable material to the special student.

We can recommend nothing better to men in the industry who would spend a few pleasant hours of entertainment and intellectual profit.

Metallurgy

PRINCIPLES OF METALLURGY OF FERROUS METALS, Leon Cammen, M. A.—Published by A. S. M. E.—N. Y.—1926; VII 137 pp.

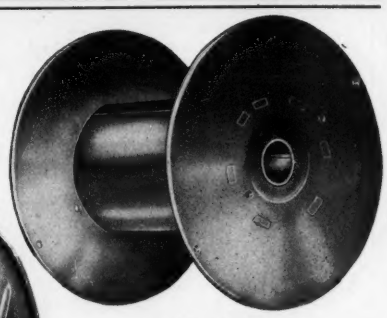
MR. Cammen's series of articles, originaly published in "Mechanical Engineering" under the auspices of the A. S. M. E., and now presented in book form, afford the present day engineer an opportunity to become familiar in an entirely uncontroversial manner with the modern theories concerning Physical Metallurgy.

Metallography, while not a new science by any means, has made rapid strides of recent years. As pointed out in the foreword by Alexander Graham Christie, photomicrographs and evidence of proper microstructure are now forming an essential feature of engineering specifications, and a common method of control in manufacturing operations. This is, of course, the natural trend of developments. Any therapeutical method is first developed through a study of pathological conditions, and from the careful study of "post mortems," principles applicable to the prevention of disease and maintenance of health are deduced.

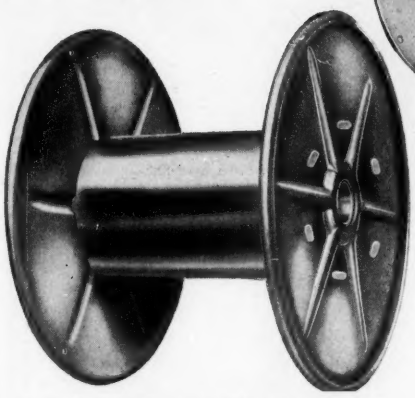
Mr. Cammen's book is not so voluminous as to appear formidable, the indexing and illustrations are admirable, and the carefully selected bibliographies at the end of each chapter afford opportunity for further reference if desired.

The first chapter—on the Physico Chemical Properties of Iron Alloys develops in as nontechnical a manner as possible the effects of ingotism, and the general consideration of the effect of carbon on the Iron-

Specializing in the Manufacturing of REELS & SPOOLS of all sizes.



For Annealing and Handling Fine Wire

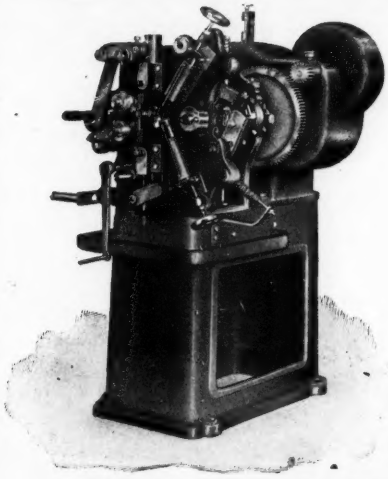


Spool for Handling and Shipping Wire. (Patented)

We solicit your inquiries

Mossberg Pressed Steel Corporation

81 WEST ST., ATTLEBORO, MASS.
2051 Grand Central Terminal, NEW YORK CITY
Russell A. Singleton, 713 Slaughter Bldg., DALLAS, TEX.
140 S. Dearborn St., CHICAGO, ILL.
101 Augusta St., GREENVILLE, S. C.



Double Spiral CHAIN LINK FENCE MACHINES

SPRING COILERS Automatic— Non-Automatic

WIRE STRAIGHTENERS AND CUTTERS for Single, Two, Three and Four Ply Wires

FLEXIBLE METALLIC TUBING MACHINES

Wafios Wire Working Machinery

J.I.BERNITZ

25 BEAVER St GENERAL AGENTS FOR NEW YORK CITY U.S.A. AND CANADA

Continuous Wire Drawing Machine

A light, compact, and inexpensive machine of the ball bearing type, for rapid and economical production of fine wire.

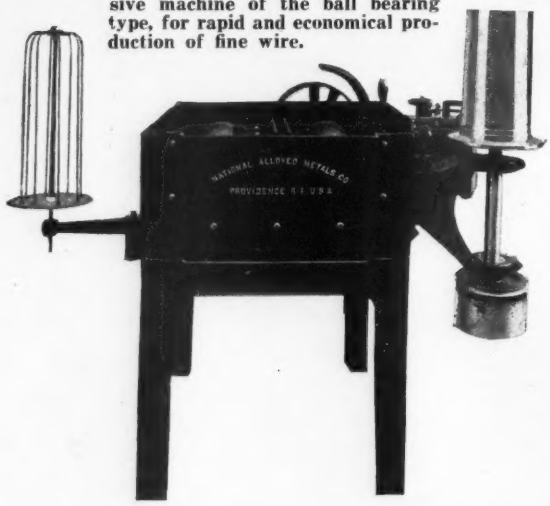


Illustration features No. 2 Machine. Capacity No. .20 B & S to .003.

We will furnish information on other sizes.

National Alloyed Metals Co.

69 Sprague St. **Providence, R. I.**

"What is the WEAK SPOT in Annealing?"

"Personnel?"

"No!"

"Facilities?"

"No!"

"What, then?"

"OBSOLETE METHODS!"

OBSOLETE methods cost money in the plant that relaxes a constant vigilance.

When a furnace manufacturer relates of saving $2.58 on fuel cost per ton of metal annealed you can make up your mind that there is "Something rotten in Denmark," for this **"saving"** is **four times** as much as the cost should have been.

The cost for fuel per ton of metal annealed should not exceed **$.60** (sixty cents). It is, therefore, incompatible with modern methods to effect a **saving** of $2.58. Only by comparison with methods long obsolete could such a **"saving"** be effected.

If you will advise us of the kind and volume of annealing you do, we will show you some facts and figures that will convince you of the merits and economy of the Bellis Lavite Process for Annealing.

THE BELLIS HEAT TREATING COMPANY
Branford, Conn.

Carbon Equilibrium diagram.

In the second chapter, the Crystalline Structure of Metals as propounded by students of the atomic theory, is described, and a very understandable treatment of the methods of determination and the future applications of this rather abstruse point of view promises well for future research. The conflicting views regarding the mechanism of plastic deformation are stated fairly and the importance of the study of the atomic structure of metals from a pure science standpoint shown.

Specifications for Wire

Under the head of "Determination of the Properties of Metal" the familiar tests as well as some of the more recent refinements are described. We, as Wire Manufacturers, subscribe heartily to his objection to specifying both chemical and physical characteristics. "To specify both is like telling a man to take only so many steps per minute and yet cover a certain distance per hour" regardless of the length of his legs, and spacing of his steps His position regarding sulphur and phosphorus is sound, and, if followed would obviate in many cases the economic loss to the country caused by prejudiced and unscientific specifications. The effect of less well known elements and gases is discussed, and the inefficacy of chemical analysis alone pointed out. Other tests such as reflection photography, as he terms microscopic analysis as opposed to X-ray analysis, corrosion resistance, determination of stability or fatigue, magnetic analysis, machinability, workability or ductility, resistance to erosion, particularly for turbine blade work, spectroscopy, and the somewhat fanciful sound testing are mentioned and briefly described.

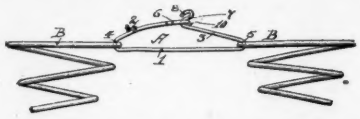
The chapter on heat treatment, although commencing in antiquity sets forth the modern delta iron theory as well as the older allotropic explanation for the hardening of iron-carbon

(*Continued on page 64*)

Review of Patents

Conducted by Eugene Grunstein

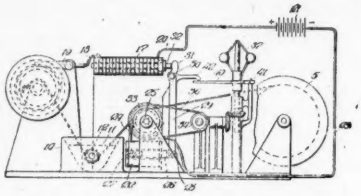
Clip for Springs



A clip, especially to connect helical springs, composed of a single piece of wire bent upon itself to form a body member and two oppositely directed arms of unequal lengths. The end of one arm is bent to form a loop while the other arm is bent in goose neck form for engagement with said loop.

U. S. Patent No. 1,608,705 issued to James L. MacInerney, Grand Rapids, Mich, Nov. 30, 1926.

Coil Insulator

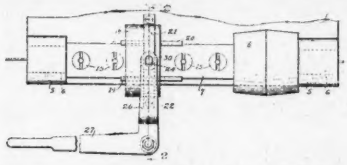


This device, essentially a coil winder, is designed to apply a preliminary coating or film of insulating material to the wire, as it is wound upon the coil, and to heat the wire during the winding operation to bake the coating of the insulation thereon. An excess of liquid insulation is applied to fill the interstices between adjacent convolutions of the coil. This insulation is subsequently hardened by the maintenance of heat in the coil wire after it has been wound.

U. S. Patent No. 1,606,393, issued to V. G. Apple, Dayton, Ohio. Nov. 9, 1926.

Wire Straightener

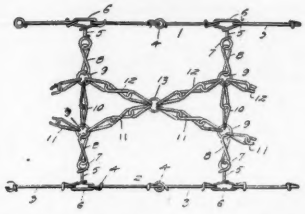
The invention may be regarded as an improvement on a wire straightening arbor forming the subject-matter of Patent No. 1,473,256, dated November 6th, 1923, to E. F. Shuster, as it affords a means for moving



one or more of the dies similar to those of the aforesaid patent while the device is rotating so that if unusual conditions of the wire being treated warrant it, the die may be forced closer to a coacting element or it may be released so that it will move outwardly under the influence of the centrifugal force.

U. S. Patent No. 1,610,195, issued to A. C. Belles, Beaver Falls, Penn. Assignor to Standard Gauge Steel Co., Dec. 7, 1926.

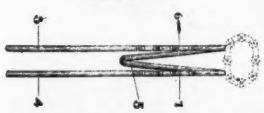
Tire Chain



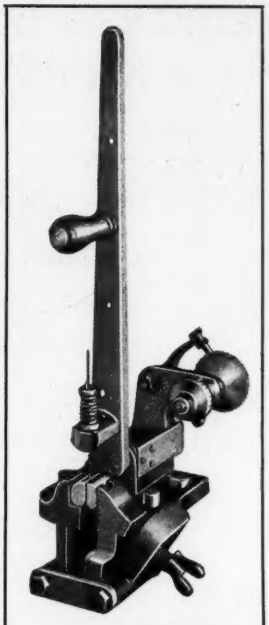
Unusual facility in attaching and detaching, is claimed for this tire chain. No special tools are required and the chain is of such a construction as to entirely prevent the tire casing from coming in contact with the ground.

U. S. Patent No. 1,598,271, issued to J. C. Edwards and C. T. Graves of Hallsville, Missouri. Aug. 31, 1926.

Another!



Hairpin. U. S. Patent No. 1,608,790, issued to T. G. W. Henslow, London, England, assignor of three-fourths to Johnson, Walker and Tolhurst, Ltd. Nov 30, 1926.



Amsler's Wire Ductility Tester

The "Usefulness" of Wire in the Manufacture of Wire Products depends in Most Cases upon its "Ductility"

The best apparatus for investigating the ductility of round and flat wire, ferrous and non-ferrous, is the "Amsler Reversed Bending Tester" illustrated above.

This apparatus gives very valuable information. It can be operated by any intelligent man in the shop and it is inexpensive.

Every wire forming shop should be equipped with this handy, practical wire tester. Some plants are using a number of them in different departments.

Write for Full Description

HERMAN A. HOLZ

Testing Engineer

17-B Madison Ave. New York

Complete Line of High Quality Metal Testing Machines.

ROTARY WIRE STRAIGHTENING AND CUTTING MACHINES

FULL AUTOMATIC

Equipped with flying shear allowing uninterrupted feed of wire through the machine.

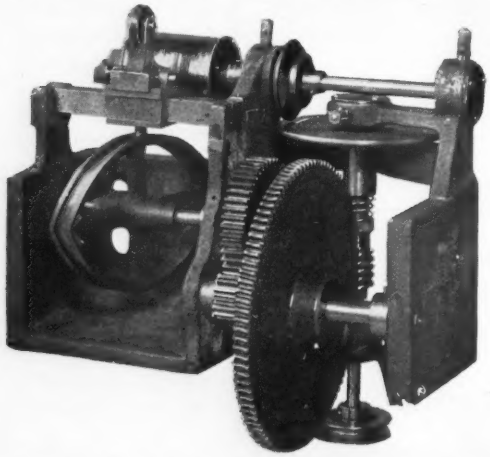
Guaranteed not to mark or swell wire in spots.

Write for Bulletin

HALLDEN MACHINE CO.
Thomaston, Conn.

Spooling Attachment

Spools wire from .018 to .003 **Dimensions 12″x12″x15″**
Weight Approximately 50 lbs. **Ball bearing equipped**



The above illustration shows an open view of our No. 1 Spooler. All gears are enclosed.

Uniform tension and lay of the wire on the Spool is assured by the use of a screw cam. It is inexpensive, simple to operate and can quickly be attached to any machine.

CYRUS CURRIER & SONS
365 Market St. **NEWARK, N. J.**

Digest of Current Literature on Wire

Increasing the Size of the Units of Production. Ind. Management, 72:115-16, August, 1926.

A discussion of the increased use of materials handling machinery in manufacturing plants. Special reference is made to wire mills.

Lessons From a Hoisting Accident. By Letron Balliet, Engineering and Min. J. 122:614-15, October 16, 1926.

A discussion of hoisting conditions under which a hoisting rope broke but the falling skip caused but little damage although it was loaded with 3000 pounds of waste. Stresses the importance of good lubrication.

Straight Socketing With Zinc Proves Efficient. Coal Age, 29:640, May 6, 1926.

Brief discussion of experience in some mines with straight socketing. Sockets with wires left straight and using zinc as filler proved satisfactory.

Socketing Phono Hi-Strength Cables. Engineering and Contracting, 65:183, October, 1926.

Because of the relatively high melting point of zinc and the relatively low annealing temperature of copper and bronze, there is danger of softening the copper and bronze cables if zinc is used for socketing. A socketing of tin and lead was therefore developed.

Value of Beautifying Industrial Property. By Russel Byron Williams, Gas Age, 57:907-8, June 26, 1926.

How practical and aesthetic requirements are reconciled in wire fencing. The experience of a gas company is discussed. Fencing led to increased good will between neighbors and to protection.

Wire Works Has Year of Prosperity

California Wire Co., Makes Annual Report of Goods Manufactured

REFLECTING continued prosperity in its industrial activities, the California Wire and Cable Company, Orange's wire factory, today completed its business year with sales showing an increase of approximately $300,000 over 1925, according to the announcement. During the past year, the company shipped 300 cars of finishing wire, weighing approximately 12,000,000 pounds, it is said.

Officials announced that the firm's tenth semiannual dividend will be mailed to stockholders next week. The forthcoming check is expected to total approximately $30,000. It will be distributed among 156 stockholders.

In the past two weeks, the company booked orders for approximately 4,000,000 pounds of wire to be shipped during the first four months of 1927, officers declared.

From Los Angeles (Cal.) Times Dec. 26, 1926.

At the Institute of Metals

AT the Annual General Meeting of the Institute of Metals, to be held in London on March 9th and 10th, seventeen papers are expected to be submitted. In the evening of March 9th the annual dinner of the Institute will take place at the Trocadero Restaurant.

The past year witnessed a steady growth in the membership of the Institute of Metals in spite of Great Britain's industrial troubles. The membership on December 31, 1926, was 1801, as compared with 1692 a year previously. Particulars of the Institute, incorporated in a newly issued booklet, can be obtained by intending applicants for membership from the Secretary, Mr. G. Shaw Scott, M. Sc., 36 Victoria Street, London, S. W. 1.

Cableway

A cableway installed in the Argentine Andes is at the same time the world's highest, with the highest existing power station, but is also the longest. This extends from Chilectto Station on the Argentine Northern Rail Road, which is 3,430 ft. above the sea, for a distance of 22 miles to a point 14,933 ft. above sea level. It spans chasms 300 ft. wide and more han 600 ft. deep, and at some points is suspended on 130-ft. towers. The whole length of the cable is 87 miles. It has a carrying capacity of 44 tons of ore an hour, a car of 1,100 lb. capacity being dispatched every 45 secs.

Contributed by Morris A. Hall.

Japanese Wire Industry

THERE are 11 companies in Japan manufacturing electric wire. Their combined capital is estimated at $16,145,000, with individual capitalizations ranging from $66,300 to $6,231,000. The manufacturers have shown particular skill in the production of various lines of small and medium gauge copper wire, both bare and insulated. In 1909 the production of wire and cable totalled $2,941,500 in value; it increased to $24,156,500 in 1919, and amounted to $43,736,800 in 1924.

Purchased by Torrington Company

THE Torrington Manufacturing Company of Torrington has purchased the business of the machine division of the Blake and Johnson Manufacturing Company of Waterbury. The Blake and Johnson Company operates two plants, one the machine division and one the manufacturing division. Neither properties are included in the sale.

(Connecticut Industries Jan. 1927.)

RIEHLE

Back in 1866 while we were still in the scale business, S. Fulton and Co., manufacturers of cast iron pipe, were having trouble with rejections of their product. Mr. Fulton suggested that they

WRITE RIEHLE

and ask us to solve their problem. Thus we designed and made the first Testing Machine. It was crude but served the purpose, and after that the engineering profession continued to

WRITE RIEHLE

to solve their testing problems, until now we make over a thousand different machines and appliances to meet the countless needs of the physical testing field. If you are contemplating purchasing a Testing Machine, or desire catalogues and information

WRITE RIEHLE

and know that we will give the same satisfactory service to you as we did back in 1866 to S. Fulton and Company.

Riehle Bros. Testing Machine Co.

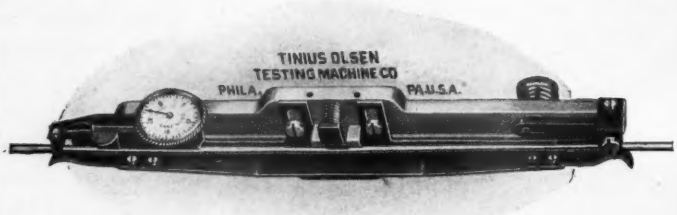
1424 North 9th Street

Philadelphia, Pa.

TESTING MACHINES

OLSEN TESTING AND BALANCING MACHINES

TESTING INSTRUMENTS



The above illustration covers one of many different types and sizes of Olsen Wire Extensometers for use in accurately determining the elastic limit of the wire, and the modulus, should it be desired.

The accurate elastic limit or modulus. can only be determined from instruments attached directly to the wire, and elongation only accurately determined by means of Special Olsen Elongation Scale attached to the wire, or, in the case of an Autographic Machine, by measuring the elongation autographically directly from set points on the wire.

Olsen Autographic Wire Testers measure elongation accurately directly from the wire itself and not from the motion of the parts of the machine.
For complete data as to Olsen Wire Testing Equipment, write for catalog No. 10 part "E" on "Olsen Wire Testing Machines."

To eliminate vibration and speed up production, all rotating parts should be accurately balanced statically and dynamically. This can be accomplished with accuracy, ease and despatch by using Olsen Static-Dynamic Balancing Equipment.
Full information as to this equipment will be mailed on request.

Sole Manufacturers

TINIUS OLSEN TESTING MACHINE CO.
500 North 12th St., Philadelphia, Pa.

Carbon Drill Rods of Small Diameter

(*Continued from page 53*)

the rod is washed off in clean water either with a hose or by being dipped up and down in a tank of clean water.

From the apparatus supporting the rod while it is being cleaned, it passes to a rack where it is thoroughly rinsed with water containing a slight amount of old spent sulphuric acid. This spent acid water causes the rod to turn green in color, and when properly applied, the green color covers the rod with an even, uniform coating. This coating is applied in order to aid in the lubrication of the steel as it passes through the die when being drawn.

As soon as the desired color, which is a dark grass green, is obtained, the rod is dipped in a bath of lime water containing sufficient lime in suspension to make it of a consistency equal to that of milk. This lime coating neutralizes any free acid that may have been left on the rod, forms a protecting cushion coat for the green colored surface just acquired and aids the preclusion of rust.

As a further preventative of rust, the rod is again opened up so that each individual coil of the bundle may hang separately and it is then suspended in a current of clean, dry warm air. When thoroughly dry, the coils are bundled together, and with others that have been treated in the same manner, are put into a closed oven, where the temperatureture is about 250 or 300 degrees Farenheit, and kept there for from twelve to eighteen hours. This baking, as it may be called, drives off any hydrogen that may have become occluded in the steel while being pickled, turns the formerly green layer to a chocolate-brown color, and causes the brown coat to adhere firmly to the steel.

At this point of the process, the rod is ready for the draw

(*Continued on page 65*)

Metallurgy

(*Continued from page 60*)

alloys by quenching from above the recalescent point. A very clear description of the mechanism of the iron-carbon diagram accompanies the general statements regarding the principles to be followed in successful heat treatment. Quenching baths, annealing, tempering and case hardening both by carbonizing and the newer boron and nitrogen processes receive mention.

The chapter on Cast Irons treats exhaustively the usual foundry and malleable irons and calls attention to the newer developments in pearlitic and synthetic cast irons. While the information yet on hand regarding alloys used with iron to produce special results are sketchy, enough is said to inform the reader as to the conditions of the art, and raise his expectations for the future.

The treatment of Alloy Steels is clear and concise. The effects of nickel, vanadium, manganese, chromium, chrome-nickel and molybdeum as well as the newer uranium, boron, cerium, zirconium, and tellurium additions are stated, and a page on high speed tool steel, which is more or less a wonder-worker closes the book.

To us, the value of Mr. Cammen's book is four-fold—it acquaints the engineer with our vocabulary, thus making it easier for him to appreciate the problems of the steel worker in meeting his specifications, and, in this case at least, familiarity does not breed contempt; it furnishes some of us, whose other duties have not allowed as close a following of modern developments as we would like, a concise summary of present theories and hypotheses; it presents an admirable bibliography for the student, and last but not least, it promises for the future, developments which bid fair to keep pace with the ever increasing demands of the engineer.

The A. S. M. E need have no qualms about fostering Mr. Cammen's Book.

L. D. G.

benches, and once the material has been drawn, it is called wire, although the proper commercial classification of the finished product is Drill Rod.

The rod receives its first reduction in diameter, or, is broken down on a bull block. Unwinding from a reel, upon which it has been placed, the rod passes through a wiper of waste or rags, which removes all the lime from the rod; then through a mixture of tallow and lard oil, which acts as a lubricant; then through the die, which causes the wire to be reduced from its original size of No. 5 gage by about two hundred thousandths of an inch and finally to the block traveling at a peripheral speed of about one hundred feet per minute.

Lubrication

The waste or rag wipers are held in a vise or clamp so that the wiper can be squeezed tightly around the rod, thus insuring the removal of the lime before the rod passes on into the grease.

The grease is installed in the die box, close up to the die, and is constantly worked into the hole of the die through which the wire passes.

The die itself is made of special die steel, and is made by drilling, reaming, grinding, lapping and punching the hole. The punch, being the last tool in the hole, produces a slightly hardened surface on the already polished hole, and sets the hole to exact size desired.

The wire, in being pulled through the hole by the power of the block, is wound up on the block. As its cross sectional area is decreased, its length increases, so that on the block the wire has a greater length than it had prior to passing through the die, the weight remaining the same. The wire retains its chocolate brown appearance, is round and smooth and is the exact size of the hole made in the die, if each and every part of the preceeding work has been correctly done.

After the first, and in fact, after each reduction the wire is process annealed in the muffle furnace for about three hours at a temperature of from 1150 to 1200 degrees Farenheit, pickled, coated, lime coated, dried and baked.

Each time the wire is drawn through the die, the diameter is reduced a small amount until a diameter of one hundred thousandths of an inch is attained. From one hundred the wire is reduced to eighty-five, and thence to seventy. From seventy thousandths it is reduced ten decimals every time it passes through the die until it is within ten or twelve decimals of the required finish size. At this point of the process the drawing is arranged so that the last two reductions are of three decimals each.

The wire thus finished is brown in appearance, is truly round, and has a unit tensile strength of approximately ninety thousand pounds per square inch.

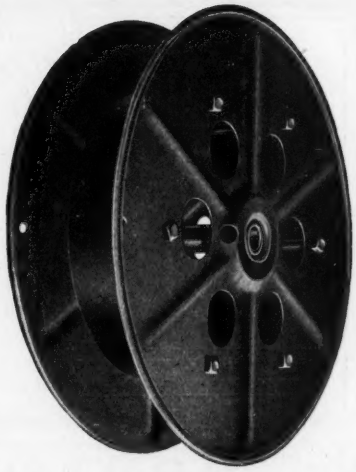
Cleaning

The wire is then cleaned and polished with emery or emery and oil. This is affected by wrapping around the wire for a length of six inches or so a quantity of waste impregnated with oil and emery, clamping the waste to the bench, and then pulling the whole length of wire through the emeried waste by means of a block, the same time winding it up on the block.

The wire progresses to the straightening department where it is straightened by means of a rotary straightener.

After threading the wire through the straightener, the straightener is made to revolve at a high rate of speed and at the same time the operator pulls the length of wire through the rotating head, walking away from the straightener with a slow but uniform gait.

When the operator has a length of about fifteen feet pulled through the straightener, he cuts it off near the machine and pulls the new end out as before. Thus the whole coil of wire is cut into straight lengths of fifteen feet. Each piece of fifteen feet is then carefully cut into lengths of three feet, the lengths



American Pressed Steel Reels

for strength, easy handling, service and long life

PRESSED steel is rapidly replacing other materials wherever both strength and lightness are desirable. This is the reason for the very general adoption of pressed steel reels and spools by large industries.

"American" Pressed Steel Reels and Spools are designed and shaped to impart maximum strength for their weight. They also embody special patented features that contribute to their rigidity and capacity for hard service.

Above is shown a 24" x 16" x 6" "American" Reel with beaded flange for shop use and shipping. Standard models range from small spools with 2½" diameter to giant reels 8' in diameter, and include Stranding, Vulcanizing, Impregnating, Braiding, Annealing, Shipping and Shop Reels and Spools and Beams for a great variety of industrial purposes.

Write for descriptive catalog explaining advantages of the "American" design and construction principles.

The American Pulley Company

Manufacturers of Steel Split Transmission Pulleys, Pressed Steel Shaft Hangers, Pressed Steel Hand Trucks and Pressed Steel Shapes

4200 Wissahickon Ave., Philadelphia, Pa.

AMERICAN PRESSED STEEL REELS

NEW YORK GENEVA

DIAMOND DIE COMPANY of AMERICA

Manufacturers of Steel Set Diamond Draw Plates

For drawing all kinds of wire

Recutting

Repolishing

Repairing

Prompt shipments

"STEELITE SET"

421 Seventh Ave., Opposite Penn Station

New York City Phone, Penn. 4226

ROBERTSON'S SOAPS

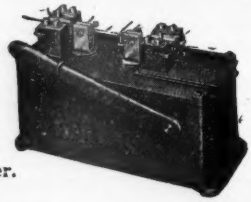
MANUFACTURERS OF WIRE DRAWING SOAPS SINCE 1895

THE J. T. ROBERTSON CO., Inc.

Syracuse, N. Y.

CABLE ADDRESS, ROBECO. 147 RICHMOND AVE.

Standard Electric Wire Pointer



Made in THREE sizes:

No. 1 machine—Capacity up to No. 12 wire.
No. 2 machine—Capacity up to No. 5 wire.
No. 3 machine—Capacity up to ⅝" diameter.
(Wire gauge—W & M standard)

Operates on either 110 or 220 volts, single phase alternating current.
Particularly adapted to shaped wires.

STANDARD MACHINE WORKS

100 Lamartine Street WORCESTER, MASS.

F. KRAUSE DIAMOND DIES

All sizes, immediate deliveries.
Dies for High Speed Wire Drawing Machines guaranteed.

F. KRAUSE & CO., Inc.
Jersey City, N. J.

Phone: Webster 5105 250 OGDEN AVE.

being accurately measured by gage.

Drill rod not made on a special order is stocked in a very well kept store room. One of the best consists of three walls of bins, appearing very much like a lock box department in a post office. The bins are one foot square and three and a half feet deep, permanently closed at the rear, and closed by a double front door at the front, with every precaution used to prevent moisture entering the bin.

The store room itself, is closed off from other parts of the mill and is kept at a constant temperature throughout the year.

The Making of Diamond Dies

(*Continued from page 53*)

unit of weight is the carat (about 205 milligrams). This unit is said to have originated in the land of the Shangallas in Africa, where from times immemorial, the seeds of the Vaura (Sun) plant have been used for weighing gold. The dried seeds have a practically constant weight, and later found their way to the East Indies, where they were used for weighing diamonds.

South Africa is the principal source, but Brazil, British Guiana, Australia, the Congo and some of the Sunda Islands also contribute to the supply. Before reaching the merchants, the diamonds are classified according to their size, form, cleanliness and origin. Until their discovery in South Africa at Capetown in 1867, the Indian diamond was the only one known. Now, however, South Africa constitutes the chief source.

Clear diamonds are used for luxury purposes, dull stones industrially and defective or porous or those having cracks find employment as crushing bortz. The latter is prepared by crush-

ing the diamond to dust in a steel mortar and its principal uses are the cutting, drilling and polishing of diamonds and other precious or semi-precious stones.

"Carbon" is a variety of diamond found in Brazil. It is a black industrial diamond, not to be confused with the pure black diamond used for luxury purposes. The former consists of genuine diamond combined with a number of other substances. Usually "Carbon" has dull edges with a glossy surface, and the color may vary from brown black to greenish or ash grey. It is so porous that it can be compared with pumice and the like.

In hardness, "carbon" resembles the diamond, but on account of its porosity, the specific weight is, of course, very different. The present market price is from $115.00 to $150.00 per carat, and its chief use is for drilling.

Six or more "carbons" are usually set in the drilling crown.

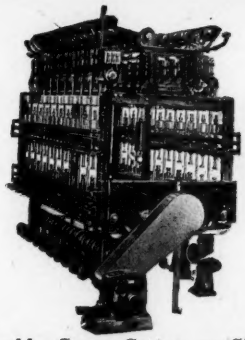
Accident Prevention in Wire Mills

(*Continued from page 52*)

something of that kind. The clinics avoid all this and prove helpful in many other ways, aside from contributing largely to general education and welfare.

Proper sanitation is along the same lines. This refers to sanitation in the workers' home surroundings, as well as in the plant and while at work. In some Southern wire mills, where much colored labor is employed, it has been found helpful to drain swamps nearby so as to eliminate mosquitoes. This reduced malaria fever cases from 6,000 to 2,000 cases a year in one community.

Plant restaurants, clubs, meetings, organizations have an indirect influence on safety in that proper eating under sanitary conditions clear the brain and make for physical betterment, both of which have been shown to influence the



Double Cover Cotton or Silk INSULATING MACHINE

EST. 1855 AIMCo INC. 1915

"American" INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

517 Huntington St.

PHILADELPHIA PENNSYLVANIA U.S.A.

MAGNET WIRE

INSULATED WITH

COTTON—SILK—ENAMEL—PAPER

BREGUET HIGH-SPEED

WIRE DRAWING MACHINES

Wire Drawing Soaps and Compounds

STEELSKIN BRAND

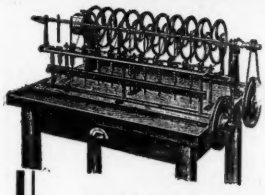
(Registered)

For High or Low Carbon Wire

Working Samples sent on request.

Established 21 years.

R. H. MILLER CO., INC. HOMER, N. Y.



"POHENKRA" WIRE DIE POLISHING MACHINE

Indispensable For All Kinds of Wire-drawing

U. S. Patents
983929—1911
1039186—1912
England 16171
1910
France 420503
Germany 226062
Austria 46389

Gives an absolute guarantee of grinding the diamond holes perfectly round, a result hard to accomplish with all devices employed before.

Simultaneously grinds the entire wall of the draw stone, including the inlet and outlet.

Ten times more effective than previous devices; one workman unassisted can polish 30 diamonds simultanously.

Write For Descriptive Literature

F. KRAUSE & CO., Inc., 250 Ogden Ave., Jersey City, N. J.

KILMER LITTLE GIANT WIRE FORMER

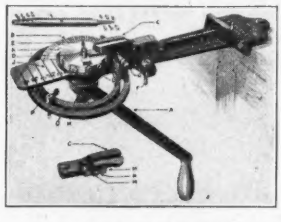
Forms Eleven Sizes of Eyes from Round, Square, Flat or Half-Round Stock, also almost any shape desired Quickly and Efficiently.

Adjustable for No. 8 to No. 24 Gage Wire.

The cut on the left shows a few of the thousands of the forms made on this

FORMER

Price $35.00



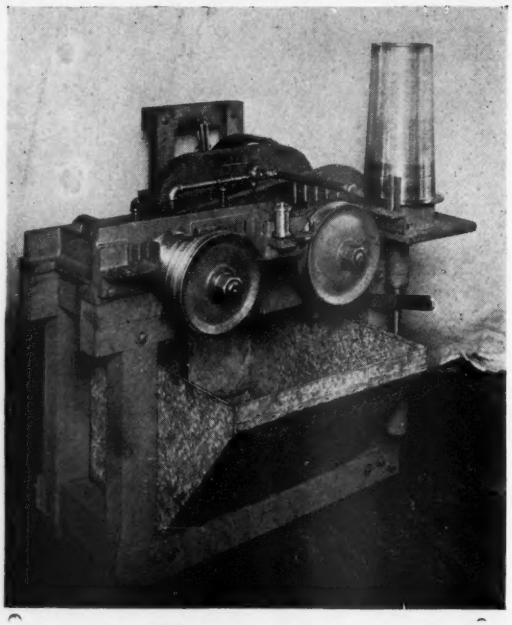
Patented April 2, 1918

M. D. Kilmer & Co. Cleveland, Ohio, U. S. A. Box 237, Station B.

The finest and most compact Wire Drawing Machine made.

Due to its lightness and simplicity one man often operates as many as six of these machines simultaneously in several plants in which they are now installed.

6-Draft Type
Floor Space 39"x54"
Capacity .032" to .004"



Designed and Manufactured by

The Superior Tool & Mfg. Co.

172 UNION ST. WORCESTER, MASS.
172 Union St. Worcester, Mass.

Full information on request.

Continuous Wire Drawing Machines
for
Dry or Liquor Finish
No. 15 Frame—Patenting Takeup

All Kinds of Draw Benches and Wire Mill Supplies

BURLINGAME MACHINE CO.
149 Commercial St., Worcester, Mass.

The Patented Diamond Die
of proven superiority
through practice and not theory.
The standard of leading wire mills.
Manufactured by:
UNION WIRE DIE CORP.
250 W. 40th St., New York City

W. E. Sommerville
Designers and Manufacturers of highest grade
Stranding Machines—High Speed and Planitary
Spooling and Winding Machines
Closing Machines
Continuous Wire Drawing Machines
Designers of Special Machinery
Coal City, Illinois

safety results. In the clubs, meetings, organizations, safety is usually a topic which is up for discussion among the men. Such free discussion of the subject brings out their individual ideas, incidentally impressing all this on the minds of all.

Bulletins and other printed matter present the subject of safety to the men directly, clearly and forcibly. There should always be something good on the subject of safety on the shop bulletin boards. Moreover this should be changed frequently to keep a live active interest in it. Sometimes a before and after picture of an accident, altho blunt and perhaps cruel, is found to be very forceful.

Gardens and playgrounds are in much the same class as athletic fields, clubs and sports previously commented upon in that they call for more time out of doors and thus, clearer mind and a better physique. Many firms have found it very profitable to permit their employees to plant the unused land to gardens, securing in this manner better and cheaper living on the one hand, and better health and physical condition on the other. Peace of mind, health and a good physique contribute largely to safety.

The plant safety organization is probably the most important of all, for this determines what is to be done and how, what moves are to be made toward increased safety, how far to go with them, etc. A good plan of organization, which has been found successful as well, includes a central committee of safety, a subsidiary safety committee for each department, and special committees appointed by the others to look into special problems.

The members of the plant or central committee should include so far as possible all the various occupations, and membership should be rotated frequently so as to make it possible for the largest possible number of different men, each assumably somewhat of a lead-

er, serving upon this central committee.

The subsidiary committees should meet about once a week, at which time they may receive reports from the special problem investigators. The central committee should meet about once a month. The functions of these various committees is to assist in establishing safer and better working conditions by making a study of conditions, hazards and practices, and by encouraging the cooperation of any and all employees in reporting for correction any such unsafe or hazardous conditions or practices as have escaped attention, or anything through which personal injury may result.

The general committee should have as chairman, the manager or superintendent of the plant or other person of sufficient authority to put over positive recommendations. The secretary may be the safety engineer or any member of the committee, while the latter should consist of some three to seven department heads, or foremen, or energetic leaders.

As a rule the general committee meetings are closed but upon several occasions a year, an open meeting should be held, at which practically the whole plant should be present.

Activities along these lines, aggressively followed through by any wire mill organization will result in greatly decreased number of accidents, greater all-around safety, greater production, increased content, lowered turnover.

Vianney Wire Die Works

(American Branch)

Etablissements
Joseph Vianney
Trevoux, France

Manufacturers of
DIAMOND DIES

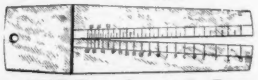
New York Offices
100 Fifth Avenue
V. J. Boulin, Mgr.

Diamond Dies

Completely made in this Country by latest scientific method.

New way of
re-inforcing the Diamond
R. Kohl, Diamond Die Co.
655 Broad St., Newark, N. J.

A. WALDECK & COMPANY
Wire Gauges



7607 Broadway, S. E.
CLEVELAND, OHIO

Broden Construction Co.
Wire Mill and Cold Rolling Equipment
10255 Harvard Ave.
CLEVELAND, OHIO

Diamond Dies
and
Diamond Tools

PAUL STEINER
463 Eighth Ave.
NEW YORK CITY

The Waterbury Wire Die Co.

Diamond and Chilled
IRON DIES
DIAMOND TOOLS
Waterbury, Conn.

Modern Equipment

for
WIRE DRAWING
WIRE INSULATING
WIRE STRANDING

Cabling and Laying up Machines

Complete Equipment for the manufacturing of Conductor Cable and Wire Rope

New England Wire Machinery Co
Designers & Engineers
NEW HAVEN, CONN.

Want Ads

10 cents per word, minimum charge $2.00.
Four insertions at three time rate.

POSITION WANTED

A specialist in Tool and Die making for wire machines, recently arrived from Europe would like position in his special line.

Box 41
Wire & W. P. 471 4th Ave.
N. Y. C.

BUYERS' GUIDE

BAKERS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

BENCHES, WIRE DRAWING
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Burlingame Machine Co.

CRANES
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

DIES, CHILLED IRON
The Waterbury Wire Die Co., Waterbury, Conn.
Master Wire Die Corp.

DIES, DIAMOND
Union Wire Die Corp., New York, N. Y.
F. Krause & Co., Inc., Jersey City, N. J.
Vianney Wire Die orks, New York.
The Waterbury Wire Die Co., Waterbury, Conn.
R. Kohl Co., Newark, N. J.
Diamond Die Co. of America, New York.
Balloffet Diamond Wire Dies Co., Inc., New York.
Paul Steiner, N. Y. C.
Cochaud Wire Die Co., New York.

DIES: Repairs & Re-Cutting
F. Krause & Co., Inc., Jersey City, N. J.
Paul Steiner, N. Y. C.

EQIUPMENT: Miscellaneous
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
M. A. Irmischer, New York.
Cyrus Currier, Newark, N. J.
Broden Const. Co., Cleveland, Ohio.
J. I. Bernitz, New York.

FURNACES, Wire Annealing
Chas. F. Kenworthy, Inc., Waterbury, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Bellis Lavite Co., Branford, Conn.

GAUGES, WIRE
A. Waldeck & Co., Cleveland, Ohio.

LATHES, DIE REAMING
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY, ARMORING (Cable, Wire, Hose)
Sleeper & Hartley, Inc., Worcester, Mass.
J. I. Bernitz, New York.
W. E. Sommerville, Coal City, Ill.

MACHINERY, BALANCING
Herman A. Holz, New York.
Henry L. Scott Co., Providence, R. I.

MACHINERY, BUNDLING
Sleeper & Hartley, Inc., Worcester, Mass.
J. I. Bernitz, New York.

MACHINERY, CUTTING
Halden Machine Co., Thomaston, Conn.
The F. B. Shuster Co., New Haven, Conn.
J. I. Bernitz, New York.

MACHINERY, COILING
Sleeper & Hartley, Inc., Worcester, Mass.
J. I. Bernitz, New York.

MACHINERY, CHAIN FORMING
M. A. Irmischer, New York.
J. I. Bernitz, New York.

MACHINERY, ELECTRIC CHAIN WELDING
M. A. Irmischer, New York.
J. I. Bernitz, New York.

MACHINERY, FORMING
M. D. Kilmer & Co., Cleveland, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
M. A. Irmischer, New York.
J. I. Bernitz, New York.

MACHINERY, GEM CLIP
M. A. Irmischer

MACHINERY, INSULATING
American Insulating Machinery Co., Philadelphia, Pa.

MACHINERY, NAIL
Sleeper & Hartley, Inc., Worcester, Mass.
M. A. Irmischer, New York.

MACHINERY, POINTING
Morgan Construction Co., Worcester, Mass.
Standard Machine Works, Worcester, Mass.
M. A. Irmischer, New York.

MACHINERY, PIN & NEEDLE
M. A. Irmischer, New York.

MACHINERY, SCREW WIRE
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY, SPRING MAKING
Sleeper & Hartley, Inc., Worcester, Mass.
J. I. Bernitz, New York.

MACHINERY, STAPLE
Sleeper & Hartley, Inc., Worcester, Mass.
M. A. Irmischer, New York.
J. I. Bernitz, New York.

MACHINERY, STRAIGHTENING
Hallden Machine Co., Thomaston, Conn.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
M. A. Irmischer, New York.
J. I. Bernitz, New York.

MACHINERY, STRANDING
Sleeper & Hartley, Inc., Worcester, Mass.
New England Wire Machinery Co., New Haven, Conn.
M. A. Irmischer, New York.
W. E. Sommerville, Coal City, Ill.
Cyrus Currier, Newark, N. J.
J. I. Bernitz, New York.

MACHINERY, SPOOLING
Cyrus Currier, Newark, N. J.
M. A. Irmischer, New York.
American Insulating Machinery Co., Philadelphia, Pa.

MACHINERY, PANNING
American Insulating Machinery Co., Philadelphia, Pa.

MACHINERY, CABLE
W. E. Sommerville, Coal City, Ill.

MACHINERY, DIE POLISHING
F. Krause & Co., Inc., Jersey City, N. J.

MACHINERY, TESTING
Herman A. Holz, New York.
Henry L. Scott Co.
Tinius Olsen, Phila., Pa.
Riehle Bros., Phila., Pa.

MACHINERY, WINDING
Sleeper & Hartley, Inc., Worcester, Mass.
J. I. Bernitz, New York.

MACHINERY, WIRE DRAWING
Morgan Construction Co., Worcester, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
The Vaughn Machinery Co., Cuyahoga Falls, Ohio.
Burlingame Machine Co.
National Alloyed Metals Co., Providence, R. I.
Superior Tool & Mfg. Co., Worcester, Mass.
W. E. Sommerville, Coal City, Ill.
M. A. Irmischer, New York.
Broden Const. Co., Cleveland, Ohio.
Cyrus Currier, Newark, N. J.
American Insulating Machinery Co., Philadelphia, Pa.

REELS, TAKE OFF & STRANDING
Attleboro Pressed Steel Corp., Attleboro, Mass.
American Pulley Co., Philadelphia, Pa.
Hubbard Spool Co., Philadelphia, Pa.

REELS, ANNEALING
Mossberg Pressed Steel Corp., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
American Pulley Co., Philadelphia, Pa.

PRESSES, RIVET & BOLT
M. A. Irmischer, New York.

SOAPS, WIRE DRAWING
National Oil Products Co., Harrison, N. J.
R. H. Miller Co., Homer, N. Y.
T. J. Robertson Co., Syracuse, N. Y.

SPOOLS, WIRE & CABLE
Mossberg Pressed Steel Corp., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
American Pulley Co., Philadelphia, Pa.

TOOLS, DIAMOND
F. Krause & Co., Inc., Jersey City, N. J.
The Waterbury Wire Die Co., Waterbury, Conn.

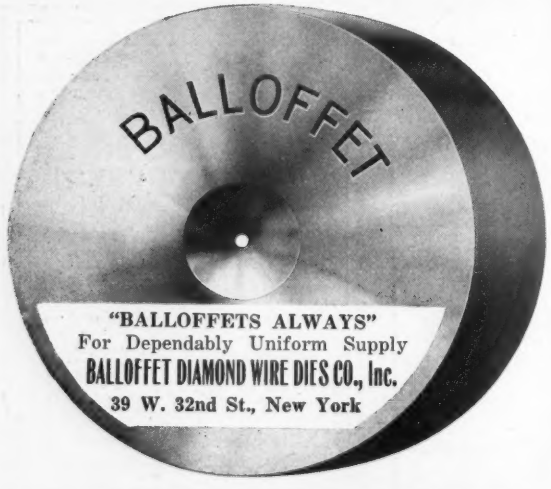
TRUCKS
Morgan Construction Co., Worcester, Mass.

WIRE, IRON & STEEL
Seneca Wires Mfg. Co., Fostoria, Ohio.

WIRE, FINE SILVER, GOLD, ETC.
National Alloyed Metals Co., Providence, R. I.

WIRE WEAVING LOOMS
M. A. Irmischer, New York.

This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.



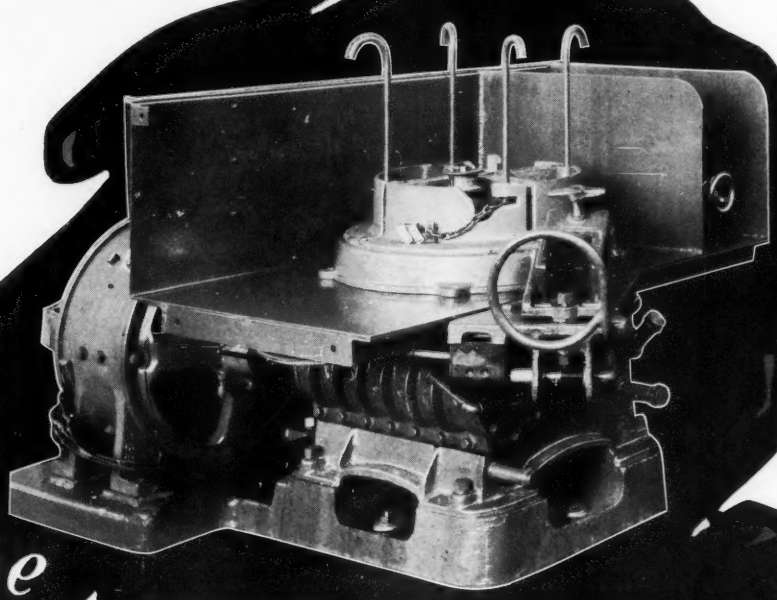
Are You Interested in Insulation Problems Read "Plastics"

A Monthly Publication devoted to composition materials.

PLASTICS

471 FOURTH AVE., NEW YORK, N. Y.

Yearly Subscription $3.00
Foreign Subscription $4.00



The VAUGHN MOTOBLOC

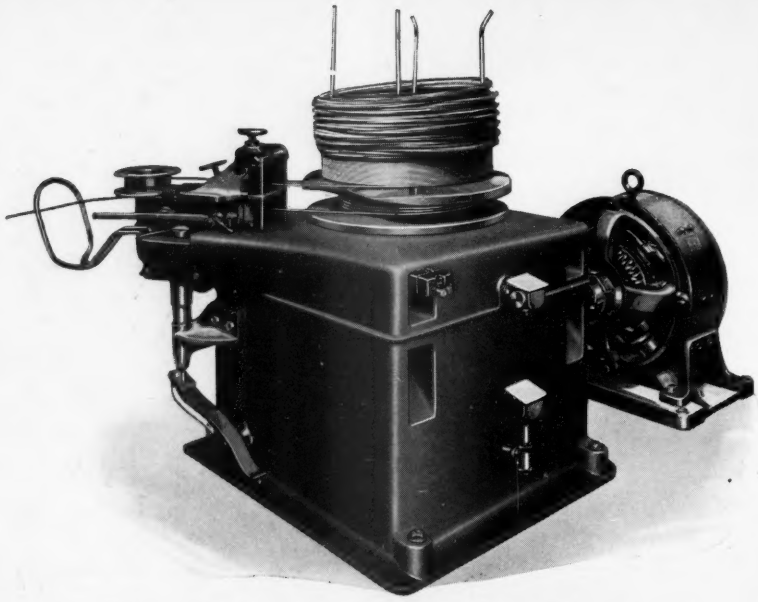
(PATENTS APPLIED FOR)

Efficient, compact, simple—yet the positive answer to the demand manufacturers have made for years for a machine that would give flexibility, speed production—and lower net costs.

You can't afford to pass unnoticed the great advantages offered you by this machine. Ask us for definite information and data pertaining to your particular use.

The Vaughn Machinery Company
Cuyahoga Falls, Ohio

MORGAN
WORCESTER
ENGINEERS AND MANUFACTURERS



The Morgan Double Decker

A direct motor connected block for the production of high or low carbon wire in sizes from 8 to 10½ gauge in two simultaneous drafts from #5 rod.

Output per man is increased 40% to 50% and output per spindle and per unit of floor space *is doubled.*

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS, U.S.A.